



TITLE:

Taxonomic Studies on the Shallow Water Gammaridean Amphipoda of West Kyushu, Japan -VI. Lysianassidae (Orchomene), Megaluropus family group, Melitides (Cottesloe, Jerbarnia, Maera, Ceradocus, Eriopisella, Dulichiella)-

AUTHOR(S):

Hirayama, Akira

CITATION:

Hirayama, Akira. Taxonomic Studies on the Shallow Water Gammaridean Amphipoda of West Kyushu, Japan -VI. Lysianassidae (Orchomene), Megaluropus family group, Melitides (Cottesloe, Jerbarnia, Maera, Ceradocus, Eriopisella, Dulichiella)-. PUBLICATIONS OF THE SETO MARINE BIOLOGICAL LABORATORY 1986, 31(1-2): 1-35

ISSUE DATE:

1986-03-25

URL:

<http://hdl.handle.net/2433/176120>

RIGHT:

**Taxonomic Studies on the Shallow Water Gammaridean
Amphipoda of West Kyushu, Japan**
**VI. Lysianassidae (*Orchomene*), *Megaluropus* family group,
Melitides (*Cottesloe*, *Jerbarnia*, *Maera*, *Ceradocus*,
Eriopisella, *Dulichella*)**

By

Akira Hirayama²⁾

Amakusa Marine Biological Laboratory, Kyushu University,
Reihoku-cho, Amakusa, Kumamoto, 863-25, Japan

With Text-figures 197-220

Lysianassidae

Orchomene

***Orchomene naikaiensis* (Nagata, 1965)**

Orchomene littralis Nagata, 1965: Nagata 1965a, p. 143-145.

Homonymy to *Orchomene littralis* (Schellenberg, 1926) (Schellenberg 1926).

Remarks. As *Orchomenella* and *Allogaussia* fused into *Orchomene* (J.L. Barnard 1969c), *Orchomenella littralis* Nagata, 1965 become homonymy to *Orchomene littralis* (Schellenberg, 1926) which was replaced from *Allogaussia littralis* Schellenberg, 1926. And then, the new name, *Orchomene naikaiensis* (Nagata, 1965) is replaced to *Orchomenella littralis* Nagata, 1965.

Key to the species of *Orchomene*

- 1 Pleonal epimeron 3 posteriorly serrated overall.....*O. pinguis*
Pleonal epimeron 3 posteroventrally provided with 3 teeth*O. breviceps*
Pleonal epimeron 3 posteriorly unarmed2
- 2 Locking spine of pereopods 1-2 only one, simple; proximal segment of accessory flagellum stout, dilating*O. liomargo*
Locking spines of pereopods 1-2 pairing, blunt and hooked apically; proximal segment of accessory flagellum not dilating3

1) Contribution from the Amakusa Marine Biological Laboratory, Kyushu University, No. 284f.

2) Present address: Biological Laboratory, the Faculty of Liberal Arts, Asia University, 5-24-10 Sakai, Musashino-Shi, Tokyo, 180, Japan.

- 3 Accessory flagellum biarticulate, proximal segment elongate.....*O. orchospina*
 Accessory flagellum 6-articulate, proximal segment not elongate...*O. tomiokaensis*

***Orchomene pinguis* (Boeck, 1861)**

(Fig. 197)

Orchomenella pinguis Boeck, 1861: Sars 1895, p. 67-68; Stebbing 1906, p. 82; Chevreux 1935, p. 59; Stephensen 1935, p. 107; Gurjanova 1951, p. 282-284; Oldevig 1959, p. 22; J.L. Barnard 1964a, p. 90; J.L. Barnard 1967b, p. 67-68; Bousfield 1964a, p. 148-149.

Allogaussia lobata K.H. Barnard, 1932; K.H. Barnard, 1932, p. 67-68; Thurston & Allen 1969, p. 353-354.

Material examined. Shijiki Bay.

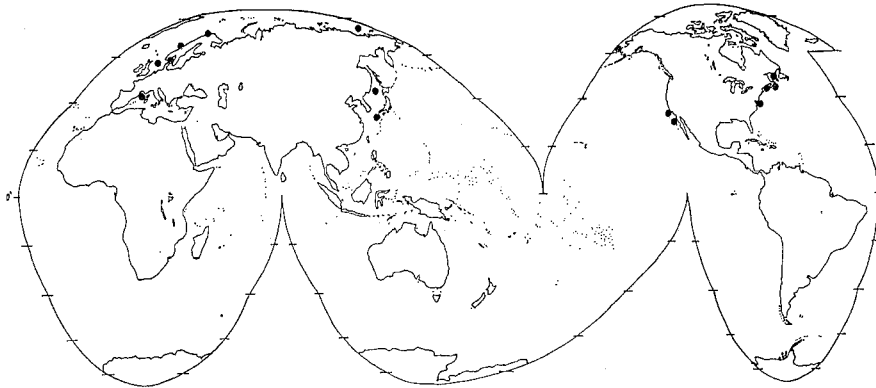


Fig. 197. Distribution of *Orchomene pinguis* (Boeck) (●) in the world.

***Orchomene breviceps* sp. nov.**

(Figs 198-200)

Body: Rostrum a little produced, triangular, anterior head lobe extending to about $\frac{2}{3}$ of peduncular segment 1 of antenna 1. Eyes large, long oval, yellowish in alcohol. Coxae developed. Dorsal length of pleon as long as pereonites 6-7 combined, equal-sized; pleonal epimeron 2 ventrally pubescent, posteroventrally provided with 4 teeth; pleonal epimeron 3 obliquely expanded posteriorly, posteroventrally provided with 3 teeth. Urosomite 1 prominently concave on back; both lateral plates of urosomite 3 extended backward, covering anterior half part of peduncle of uropod 3.

Antennae: Antenna 1 stout; segment 1 of peduncle as long as head, inner side flattened, upper-median submargin with 1 longitudinal row of 9 sensory setae, segment 2 $\frac{1}{3}$ as long as segment 1, segment 3 about $\frac{1}{3}$ as long as segment 2; accessory flagellum 5-articulate; primary flagellum 12-articulate, segment 1 shorter and smaller than peduncular segment 1, gradually decreasing in thickness, inner

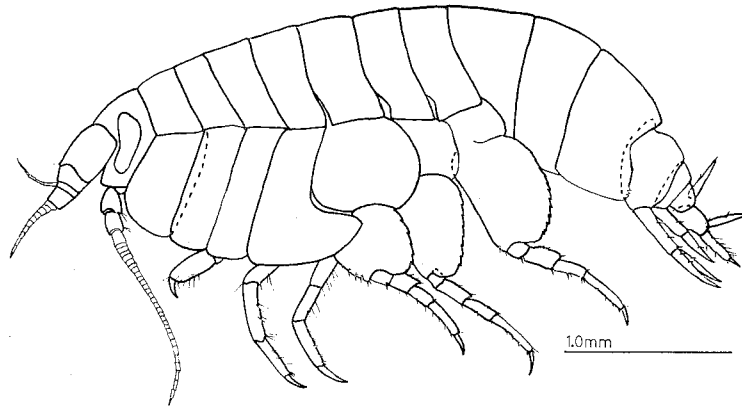


Fig. 198. *Orchomene breviceps* sp. nov. Holotype, male, 4.5 mm.

side ventrally provided with 12 transverse rows of several aesthetascs, following segments gradually growing longer and decreasing in thickness, every two articles ventrodistally provided with 2 or 3 aesthetascs. Peduncular segment 4 of antenna 2 longer than segment 3, ventromedially with 3 sensory setae, segment 5 shorter than segment 4; segment 1 of primary flagellum subequal to peduncular segment 5.

Mouthparts: Epistome weakly developed, not extending beyond upper margin of labrum. Lower lip lacking inner lobes, shoulders blunt, broad, mandibular process slender. Inner plate of maxilla 1 hairy, apically provided with 2 plumose setae; outer plate bristly, armed with 11 pectinate teeth; palp biarticulate, distal segment apically armed with 7 conical teeth and 1 seta. Maxilla densely hairy;

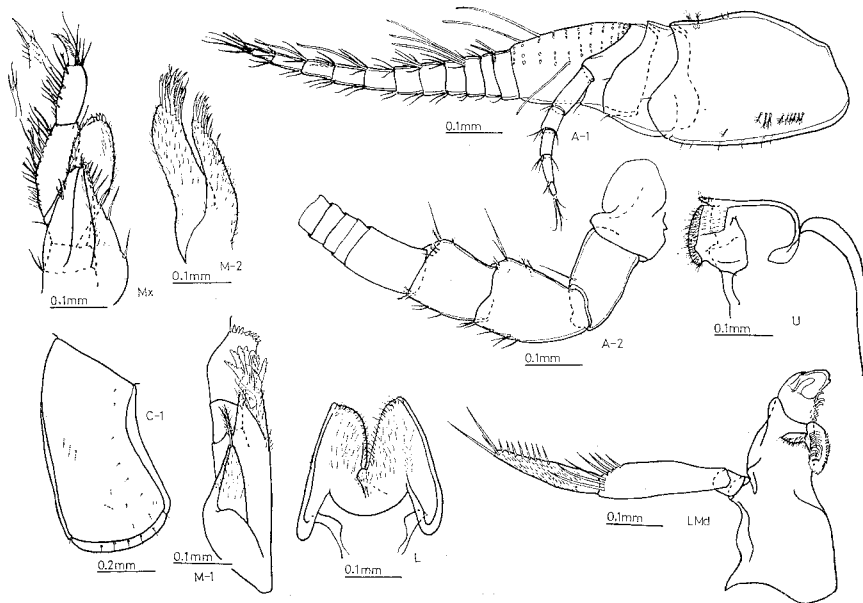


Fig. 199. *Orchomene breviceps* sp. nov. Holotype, male, 4.5 mm.

inner plate apically provided with 5 pairs of teeth and 1 single tooth, all teeth spine-like; outer plate inner-distally provided with 6 pectinate teeth and 7 flexible, simple setae. Both mandibles similar; incisor rounded, on each outer side with 1 small tooth; lacinia mobilis vestigial; accessory blades consisting of 3 unplumose, blunt setae and many small bristles; molar process medium, shriveled, molar rasp medium, hairy process lying near molar process; palp growing under level of molar process, slender, segment 2 distally armed with 1 oblique row of 7 stiff setae, these setae gradually increasing in length, segment 3 shorter than segment 2, densely bristly in rows except proximal part, provided with 8 stiff short setae on frontal half margin from apex and 1 stiff short and 2 stiff longer setae on apex. Inner plate of maxilliped triangular, apically rounded and with 3 blunt protrusions and 1 pair of setae, else on outer margin with 8 stiff setae gradually shortening, on inner half margin from apex with 3 pairs of setae; outer plate extending beyond segment 2 of palp, on inner and apical margins provided with 14 conical teeth; palp rather slender, about half of short setae trifurcate, segment 3 about half as long as segment 3, segment 4 longer than half as long as segment 3, falcate, apically provided with nail and 1 short spine.

Gnathopod 1: Coxa 1 posteroventrally provided with 1 blunt notch armed with 1 minute seta. Gnathopod 1 small, almost uniform in width. Basis about half as long as gnathopod 1, posterodistally armed with 2 small setae and 1 slender, long spine. Ischium posterodistally provided with 1 slender, long spine. Merus triangular, posteriorly bristly. Proximal 2/3 part of carpus triangular, posterior free margin bristly. Propod rectangular, posterior half part from base bristly; palm transverse, defined by 2 stout and 1 small spines, finely pectinate. Dactyl stout, nail-like, grasping margin medially provided with 1 seta.

Gnathopod 2: Minutely chelate, longer than gnathopod 1, slender. Basis shorter than coxa 2, posterodistally armed with 1 slender spine. Ischium half as long as basis, posterodistally provided with 1 slender spine. Merus shorter than half of ischium, hump-like, posteriorly bristly in rows, posterodistally provided with 1 pair of setae. Carpus as long as ischium, gradually expanding, densely bristly in rows except for proximal and anterior margins, pectinate on posterior margin, posterodistally provided with 1 group of 1 spine and 1 small seta, and anterodistally with 1 slender spine. Propod subrectangular, produced and acute posterodistally, bristly in rows, distally provided with 3 or 4 rows of several spines. Dactyl minute, extending beyond posterodistal end of propod, anteromedially provided with 1 seta.

Pereopod 1: Coxa 3 similar to coxa 2. Basis 2/7 as long as pereopod 1. Merus 2/3 as long as basis, extending anterodistally, its extension apically provided with 1 long and 1 minute setae. Carpus about half as long as basis, obliquely truncate posterodistally. Propod 1.5 times as long as carpus, posterior 2/3 part from distal end armed with 3 groups of 1 spine and 1 minute seta and 1 pair of locking spines, these locking spines rounded apically. Dactyl falcate.

Pereopod 2: Coxa 4 boot-like, expanding at 4/7 part from base at right angle. Pereopod 2 similar to pereopod 1, but propod posteriorly provided with 2 single

spines, 2 groups of 1 spine and 1 minute seta, and 1 pair of locking spines.

Pereopod 3: Coxa 5 a little broader distally than proximally. Pereopod 3 densely bristly except for dactyl. Basis most expanded proximally, posteriorly extended beyond ischium, posterodistally rounded, anteriorly rounded and provided

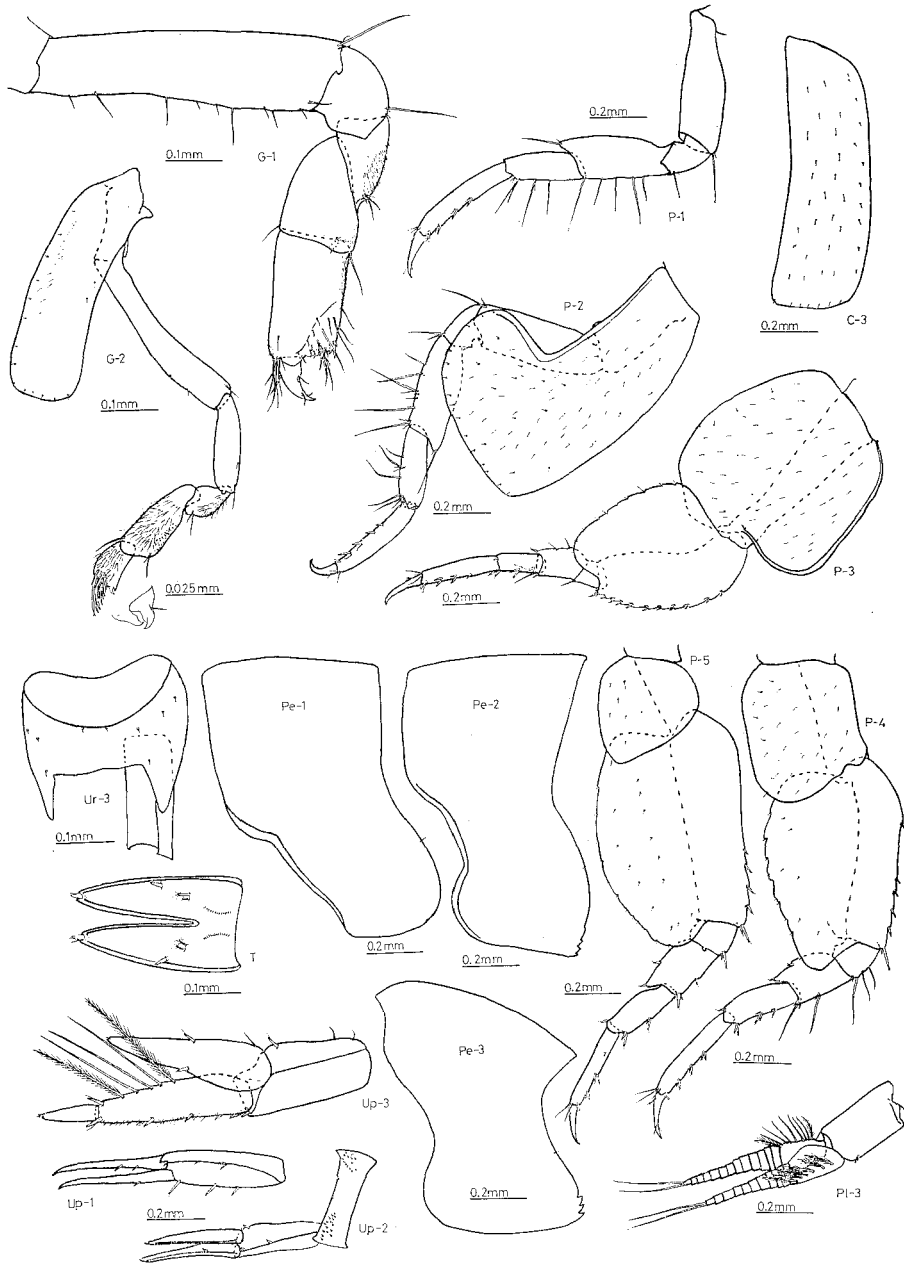


Fig. 200. *Orchomene breviceps* sp. nov. Holotype, male, 4.5 mm.

with 9 single spines and 1 distal group of 3 spines. Merus twice as long as ischium, a little expanded posteriorly, both anterodistally and posterodistally provided with 1 or 2 spines. Carpus as long as merus, anteriorly provided with 2 medial and distal pairs of spines. Propod twice as long as and as broad as carpus, posterior spine formula 1-2-2-2, locking spines rounded apically. Dactyl falcate.

Pereopods 4-5: Coxa 6 rectangular, anteroventral lobe small. Coxa 7 about half as large as coxa 6, most expanded posteriorly. Pereopods 4-5 similar except for basis of pereopod 4 most expanded proximally and, on the other hand, one of pereopod 5 medially. Basis anteriorly perpendicular. Merus and carpus equal in length, merus expanded and extended posteriorly, posteriorly provided with 2 median and distal spines, anterior spine formula on carpus 2-2-2 in pereopod 4 and 2-2 in pereopod 5. Propod longer than carpus, anterior spine formula 2-2-2-2 on pereopod 4 and 1-2-2-2 on pereopod 5, locking spines rounded apically. Dactyl falcate.

Pleopods: Pleopods 1-3 very similar, stout, short; peduncle stout, about half as long as rami; proximal segment of outer ramus provided with 3 bifid, pinnate setae; swimming setae short.

Uropods: Uropod 1 reaching apex of uropod 3; peduncle as long as rami, upper margins each with 3 spines; rami equal-sized, scimitar, proximally provided with 1 spine in inner ramus and 2 in outer ramus. Uropod 2 similar to uropod 1 in form and proportion except for shorter than one of the latter; peduncle with 1 inner distal and 2 outer distal spines; outer ramus medially provided with 1 spine, inner ramus lacking spine. Peduncle of uropod 3 about half as long as outer ramus, inner-distally armed with 1 spine and outer-ventrodistally with 1 pair of unequal-sized spines; outer ramus biarticulate, proximal segment pubescent outer-marginally, provided with 2 median and 1 distal spines on outer margin, and 1 distal spine and 5 pinnate long setae on inner margin, distal segment $2/5$ as long as proximal segment, apically provided with 1 minute seta; inner ramus subequal to proximal segment of outer ramus, medially provided with 2 opposite spines.

Telson: Telson as long as inner ramus of uropod 3, cleft far beyond half, minutely pectinate in 2 opposite rows on proximal undivided part, each lobe provided with 2 median and apical spines, and 1 median pair of sensory setae.

Material examined. Holotype: Male, 4.5 mm. Type-locality: Fukuma, Fukuoka Prefecture. Date: Oct. 22, 1979. Paratype: 7 specimens. Collection No.: AMBL-Amph. 36. Collector: H. Minei.

Remarks. The present specimens are very similar to *Orchomene naikaiensis* (Nagata, 1965) (the present paper) in gnathopods 1-2, pereopods 4-5, uropod 3 and telson, but several differences are found between them. In *O. naikaiensis*, the posterior extension of coxa 4 is not rectangular and the pleonal epimera are minutely errated, while in the present specimens the coxa 4 is rectangular, the pleonal epimeron 1 is not serrated and the pleonal epimera 2-3 are prominently serrated posteroventrally. The lobe of upper lip in *O. naikaiensis* projects beyond the labrum

and in the present species does not project beyond it. The grasping margin of dactyl in the gnathopod 1 of the present species is smoothed and its palm is defined by 3 spines, while in *O. naikaiensis* the grasping margin is minutely serrated and the palmar defining spines is 2 instead of 3. Moreover, the posterior thin plate of basis in the pereopod 3 of *O. naikaiensis* is uniform in width and its palp segment 2 of maxilla 1 is armed with 6 tooth-like spines instead of 7 spines in the present species.

These differences may be interspecific variation, and further detail and more exact comparison must be given to them, but I give up to do because Nagata (1960, 1965a) did not give the description and the figures to *O. naikaiensis* in detail and I have received nothing about his comments in spite of asking for it. Moreover, as J.L. Barnard (1969c) combined *Orchomenella* to *Orchomene*, *Orchomenella littoralis* Nagata, 1965 became homonymy to *Orchomene littoralis* (Schellenberg, 1926) (Schellenberg 1926, J.L. Barnard 1969c, the present paper). For above mentioned reasons, the new scientific name, *Orchomene breviceps*, is allocated to the present specimens.

***Orchomene liomargo* sp. nov.**

(Figs 201–203)

Body: Head about as long as pereonite 1, anterior head lobe extending beyond half of peduncular segment 1 of antenna 1. Eyes very large, long oval. Pereonite 1 longer than wide. Pleonal epimera pubescent ventrally; pleonal epimeron 1 expanded backward posteromedially; pleonal epimeron 2 posteroventrally provided with 2 blunt teeth, expanded posteromedially; pleonal epimeron 3 not armed posteroventrally. Urosomite 1 prominently concave on anterior part of back.

Antennae: Antenna 1 rather slender; peduncle about half as long as antenna 1, segment 1 subequal to head in length, prominently produced upper-distally, segments 2–3 equal-sized, produced upper-distally; accessory flagellum 4-segmented, about half as long as peduncle, segment 1 2/3 as long as whole length of flagellum, stubby, inner half part from distal end setaceous in transverse rows; primary flagellum 8-articulate, proximal segment a little shorter than peduncular segment 1, stubby, overall on inner side provided with many aesthetascs in transverse rows, following segments subequal in length, distally provided with 1 aesthetasc except for terminal segment. Antenna 2 subequal to antenna 1 in length; peduncular

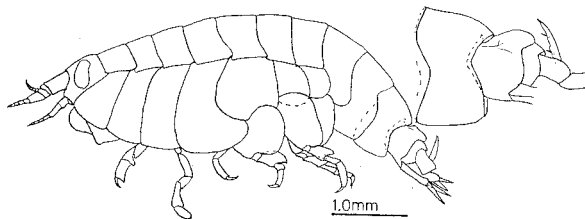


Fig. 201. *Orchomene liomargo* sp. nov. Holotype, female, 5.5 mm.

segments 4–5 equal in length, setaceous in transverse rows on upper side, ventral margin of segment 5 armed with 6 short setae; primary flagellum 7-articulate.

Mouthparts: Labrum columnar, densely pubescent, lobe projection not produced beyond labrum. Lower lip lacking inner lobe, outer plate densely pubescent on inner side, shoulders subtriangular, mandibular process well developed,

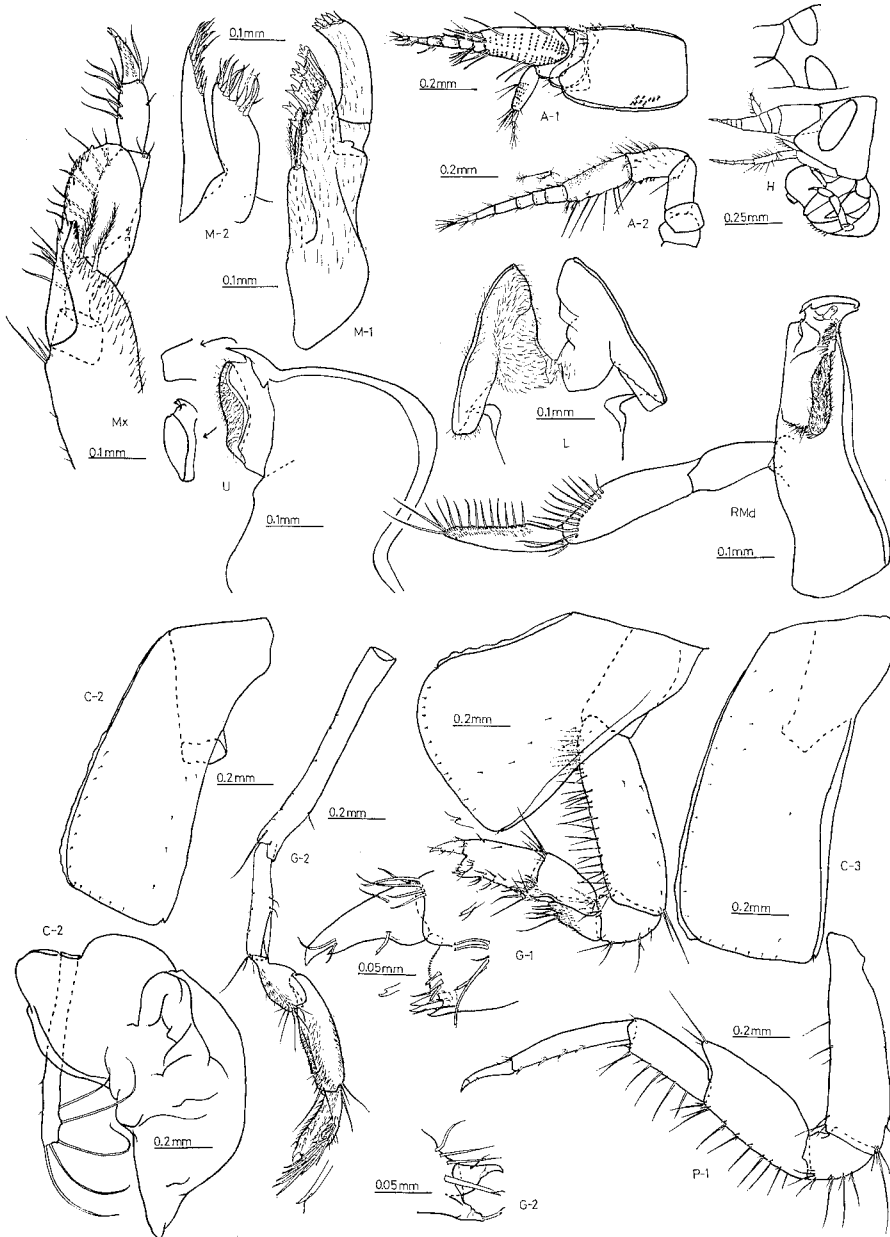


Fig. 202. *Orchomene liomargo* sp. nov. Holotype, female, 5.5 mm.

rectangular. Maxilla 1 bristly, inner plate truncate, with 2 plumose setae; outer plate provided with 6 bifid and 4 apically broad teeth, latter 4 teeth serrated on apex and armed with 1 pronounced tooth; palp biarticulate, broad, distal segment apically provided with 5 tooth-like spines and 1 seta. Inner plate of maxilla 2 apically provided with 8 stout, 3 slender and 1 small setae; outer plate apically provided with 9 pectinate tooth-like spines and 3 setae. In right mandible, incisor lobate, armed with 2 opposite outer-side teeth; lacinia mobilis vestigial; accessory blades consisting of slender foliaceous setae and 2 opposite rows of many minute and flexible setae; molar process broad and long, densely pubescent, on lower part with several protuberances and 3 tooth-like spines, hairy protuberances transversely lying near it; palp longer than whole mandible, proximal segment about $1/4$ as long as whole palp, median segment shorter than twice as long as segment 1, provided on $1/3$ part from end with 1 oblique row of 11 setae which gradually grow in length, terminal segment shorter than segment 2, upper $2/3$ part from apex minutely bristly, with 12 short and 2 apical longer setae. Left mandible similar to right mandible except for lacking lacinia mobilis. Inner plate of maxilliped provided with 2 apical, conical teeth and 2 plumose stout setae, densely hairy on distal part; outer plate reaching distal end of palp segment 2, oval, provided with 11 conical teeth on inner side, 5 small setae arrayed along teeth; palp slender, segment 3 about $1/4$ as long as whole palp, inner $2/3$ part from distal end armed with 4 pairs of unequal setae, outer distal end provided with 1 pronounced and another setae, dactyl shorter than segment 3, stout, conical, apically provided with 1 stout nail, on inner side bristly in rows.

Gnathopod 1: Rather stout. Coxa 1 remarkably produced forward anteroventrally, posteroventral minute notch armed with 1 minute seta. Basis half of whole length, densely setose anteriorly. Anterior projection of ischium provided with 1 transverse row of 6 setae. Merus as long as ischium, densely bristly on posterior about half part from apex, anterodistally provided with 7 setae. Carpus shorter than half of basis length, posterodistal part produced outward, armed with 7 spines and 1 group of 3 setae. Propod as long as carpus, rectangular, gradually narrowing a little; palm slightly oblique forward, defined by 2 spines and 1 tooth, pectinate, provided with 1 row of 3 bifid setae. Dactyl extending beyond palm when closed, grasping margin provided with notch armed with 1 pair of setae at $1/3$ from apex and with 1 bifid seta at $1/3$ from base.

Gnathopod 2: Coxa 2 posteroventrally provided with 1 small notch armed with 1 minute seta. Gnathopod 2 minutely chelate, slender. Basis shorter than half of whole gnathopod 2, prominently produced in rectangle anterodistally, posterodistally provided with 1 longer seta. Ischium about half of basis length, anterior half part from distal end concave, anteromedially provided with 2 small setae. Merus swollen, prominently extended forward anterodistally and distolaterally, anteriorly bristly in rows. Carpus longer than ischium, densely bristly both anteriorly and posteriorly except for $1/3$ part from base. Propod shorter than carpus, densely bristly posteriorly, provided on anterior half part from apex with about

4 transverse rows of several spines, posterodistal extension apically armed with 1 spine. Dactyl fitting with 1 apical spine on posterodistal extension of propod when closed, nail-like apically.

Pereopods 1-2: Coxa 3 similar to coxa 2, but broader. Coxa 4 boot-like. Pereopods 1-2 similar except for basis of pereopod 1 longer than one of pereopod 2.

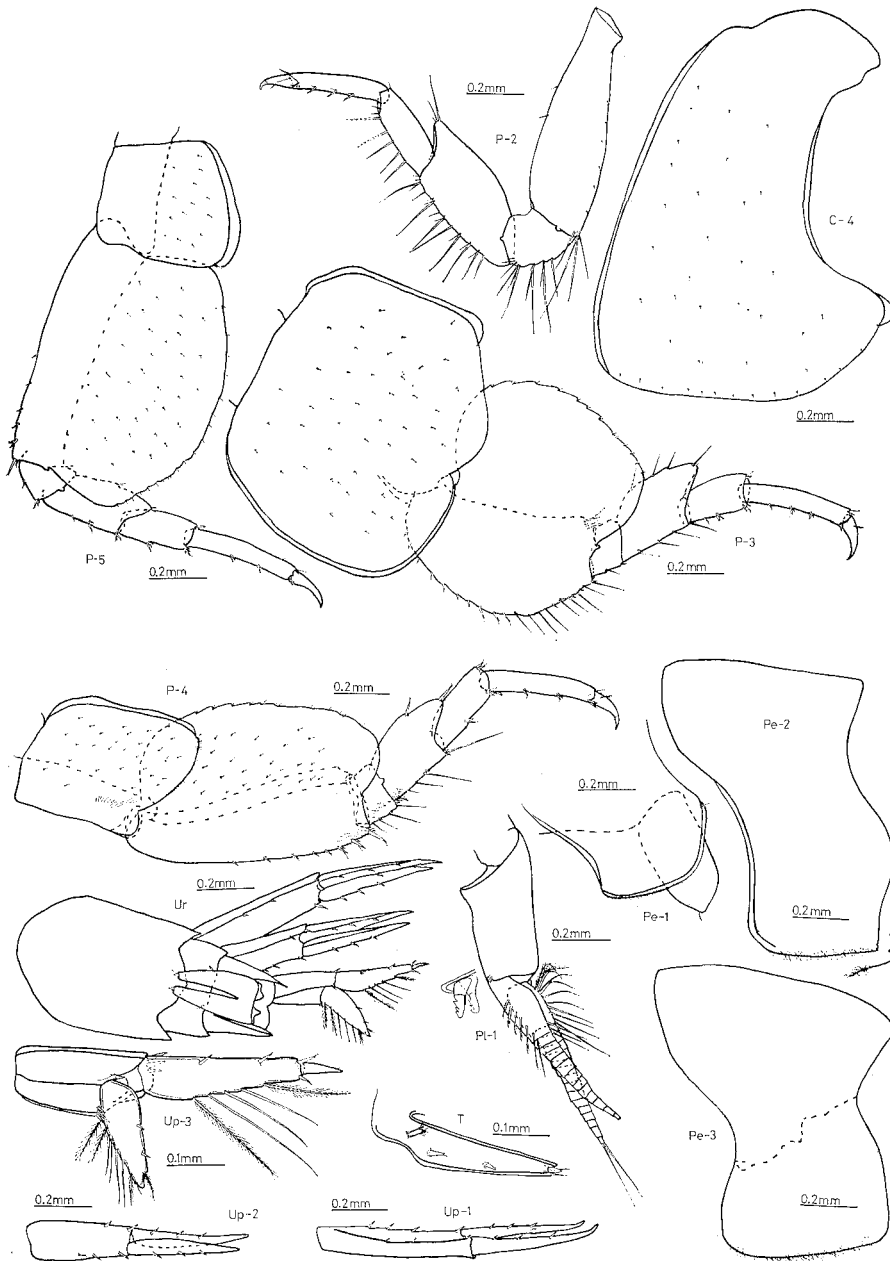


Fig. 203. *Orchomene liomargo* sp. nov. Holotype, female, 5.5 mm.

Ischium, merus and carpus dispersively setose posteriorly; merus $2/3$ as long as basis, anterodistal, prominent projection apically provided with 3 variable setae. Propod pronouncedly longer than carpus, posteriorly provided with 4 single spines arrayed in equal interval. Dactyl about half as long as propod, falcate, provided with nail.

Pereopod 3: Coxa 5 rectangular, ventral margin of posterior lobe not prominently produced. Basis rounded, posteriorly extended far beyond ischium, muscular part inner-posterodistally provided with 4 small setae. Merus anteriorly twice as long as ischium, posterodistally produced at about $1/3$ from base on carpus. Propod about 1.5 times as long as carpus, anterior spine formula 1-2-2-2.

Pereopod 4: Coxa 6 subrectangular, prominently expanded backward and downward. Basis subrectangular, posteriorly extended a little beyond ischium. Anterodistal part of basis, anterior margin of ischium and anteroproximal part of merus continuously pubescent. Posterodistal extension of merus reaching $1/3$ from base on carpus, apically provided with 1 spine. Carpus, propod and dactyl similar to those of pereopod 3.

Pereopod 5: Coxa 7 rectangular. Pereopod 5 similar to pereopod 4, but basis more roundly expanded backward, and anterodistal part of basis, anterior margin of ischium and anteroproximal part of merus not pubescent.

Pleopods: Pleopods similar; peduncle stout; proximal segment of inner ramus inner-marginally armed with about 11 plumose setae, one of outer ramus armed with 5 bifid and 2 distal simple setae, these setae pubescent; terminal swimming setae about $1/3$ as long as rami.

Uropods: Uropod 1 extending beyond uropod 3, peduncle longer than outer ramus, provided on outer margin with 2 median and 1 distal spines and on inner margin with 3 median and 1 distal spines; outer ramus longer than inner ramus, on outer side with 3 spines, inner ramus provided on inner margin with 3 spines and on outer side with 1 median spine. Peduncle of uropod 2 as long as rami, provided on both margins with 1 or 2 median and 1 distal spines; rami equal-sized, each provided with 3 spines on one side. Peduncle of uropod 3 extended ventrally, upper length a little longer than inner ramus, distally provided with 3 inner and 1 outer spines, ventrodistal end armed with 3 spines; outer ramus biarticulate, proximal segment 1.5 times as long as inner ramus, outer-marginally provided with 3 spines and inner-marginally with 5 long plumose setae and 1 distal spine, terminal segment shorter than $1/3$ as long as proximal one, conical; outer ramus foliaceous, outer-marginally provided with 2 median spines and 1 plumose short seta, and inner-marginally with 7 plumose setae.

Telson: Telson equal to outer ramus of uropod 3 in length, cleft to near $1/4$ from base, each lobe armed with 1 proximal pair of setules, 2 median spines and 1 apical group of 1 spine and 2 minute setae.

Material examined. Holotype: Female, 5.5 mm. Type-locality: Fukuma, Fukuoka Prefecture. Date: Sept. 22, 1979. Paratype: 7 specimens. Collector: H. Minei. Collection No.: AMBL-Amph. 35.

Remarks. The new species is similar to the following 4 species, *Orchomene naikaiensis* (the present paper), *O. breviceps* (the present paper), *O. japonica* (Gurjanova 1962) and *O. mannarensis* (Rabindranath 1971), in the dilated proximal segment of accessory flagellum, the pereopods 3–5 and the simple locking spines, but the new species is distinguished from them by the following characteristics.

In the new species, the inner ramus of uropod 3 is prominently shorter than the proximal segment of outer ramus and both rami of it are armed with several or many pinnate setae, while this in above 4 species is subequal or equal to that and these rami except for *O. japonica* are armed with a few plumose setae or the inner ramus without plumose setae. The palm of gnathopod 1 in 4 previous species is concave or never mounded and is not serrated. On the other hand, it of the new species is slightly mounded and is serrated. In addition, the following differences are found; (1) in *O. naikaiensis* and *O. breviceps*, pleonal epimeron 3 posteroventrally provided with teeth, (2) in *O. japonica*, accessory flagellum 5-articulate and basis of gnathopod 1 dispersively setose, and (3) in *O. mannarensis*, lacinia mobilis composed of 4 parts, outer plate of maxilla 1 outer-marginally provided with 1 row of 7 teeth and these teeth simpler than those of the new species, and carpus of gnathopod 2 produced and expanded posterodistally.

***Orchomene tomiokaensis* sp. nov.**

(Figs 204–206)

Body: Compressed, oval. Dorsal length of head as long as pereonite 1, anterior head lobe extending to distal end of peduncular segment 3 of antenna 1, broadly rounded apically. Coxae well developed, especially coxae 1–4 about twice as deep as each pereonite. Anteroventral margin of pleonal epimeron 1 slightly produced, provided with 1 spine; posteroventral angle of pleonal epimera 2–3 smooth and one of pleonal epimeron 2 rectangular. Urosomite 1 distinctly concaved dorso-medially, pronouncedly produced backward dorsally; posterior expansion of urosomite 3 reaching middle of peduncle of uropod 3.

Antennae: In antenna 1, segment 1 of peduncle about half as long as antenna 1, a little longer than wide; accessory flagellum composed of 5 plus 1 vestigial segments, about half as long as primary flagellum, slender, gradually reducing in size;

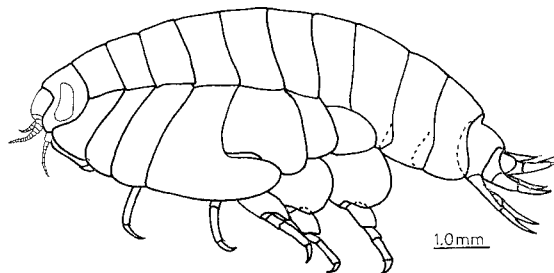


Fig. 204. *Orchomene tomiokaensis* sp. nov. Holotype, female, 10.0 mm.

primary flagellum 13-articulate, proximal segment about half as long as peduncular segment 1, not prominently large, aesthetascs arrayed in transverse rows overall on inner side of primary segment 1, following segments except 3 distal segments distally provided with aesthetascs gradually decreasing in numbers. In antenna 2, segment 2 of peduncle prominently expanded medially, gland cone rudiment, segments 3–5 subequal-sized, segment 4 compressed proximally, half part of segment 5 from apex ventrally provided with 7 stiff setae and dorsally with several groups of short setae, ventral stiff setae gradually elongate; primary flagellum 12-articulate.

Mouthparts: Large, prominently produced downward. In upper lip, upper lobe of epistome not produced beyond labrum, facial part of labrum rasp and densely hairy, ventrally provided with 4 spines. Lower lip lacking inner lobe; outer lobe densely hairy on inner sides, mandibular process developed, not expanded outward. Inner plate of maxilla 1 small, apically provided with 1 plumose seta; outer plate apically armed with 11 pectinate tooth-like spines, bristly in patches; palp biarticulate, distal segment apically provided with 12 small conical teeth. Inner plate of maxilla 2 densely setose apically; outer plate apically provided with 7 stout spines pectinated on one side of distal part and many stiff setae. Mandible slender, proximally provided with palp and dorsally with thin plate; incisor prominently produced; lacinia mobilis on left mandible very small and serrate apically, absent on right mandible; 6 accessory spines arrayed in 2 opposite rows, pinnate on one row; molar process protuberant, rather small, densely pubescent; palp triarticulate, slender, segment 1 dilated distally, segment 2 about twice as long as segment 1, 1/3 part from apex provided with 1 oblique row of 15 slender spines, distal segment

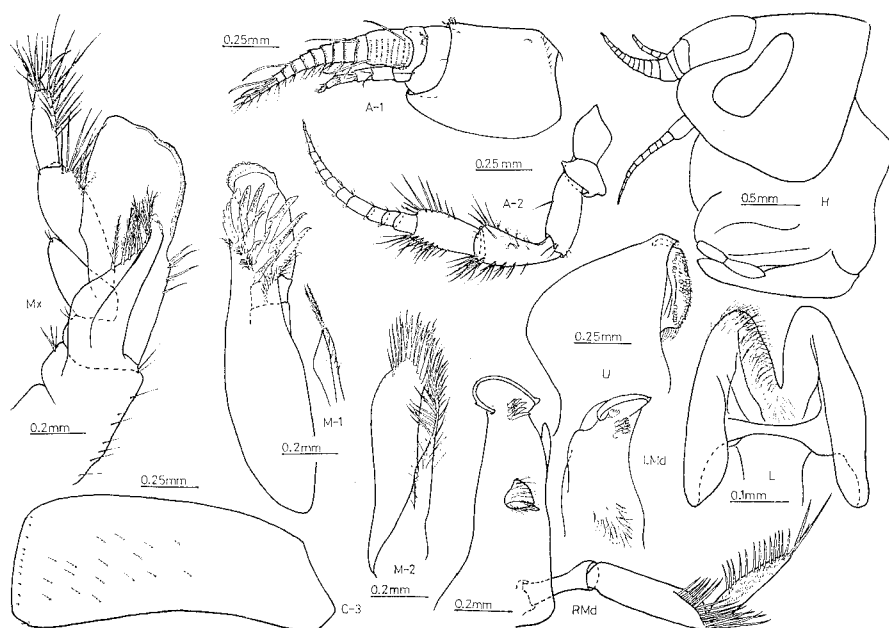


Fig. 205. *Orchomene tomiokaensis* sp. nov. Holotype, female, 10.0 mm.

a little shorter than segment 2, provided on $2/3$ margin of upper side from apex with 13 equal-sized stiff and 3 apical longer setae. Inner plate of maxilliped apically provided with 1 conical tooth, inner side with about 10 pinnate setae; outer plate reaching middle of palp segment 3, rectangular, broad, inner and apical margins provided with 22 small conical teeth continuously; palp 4-articulate, rather

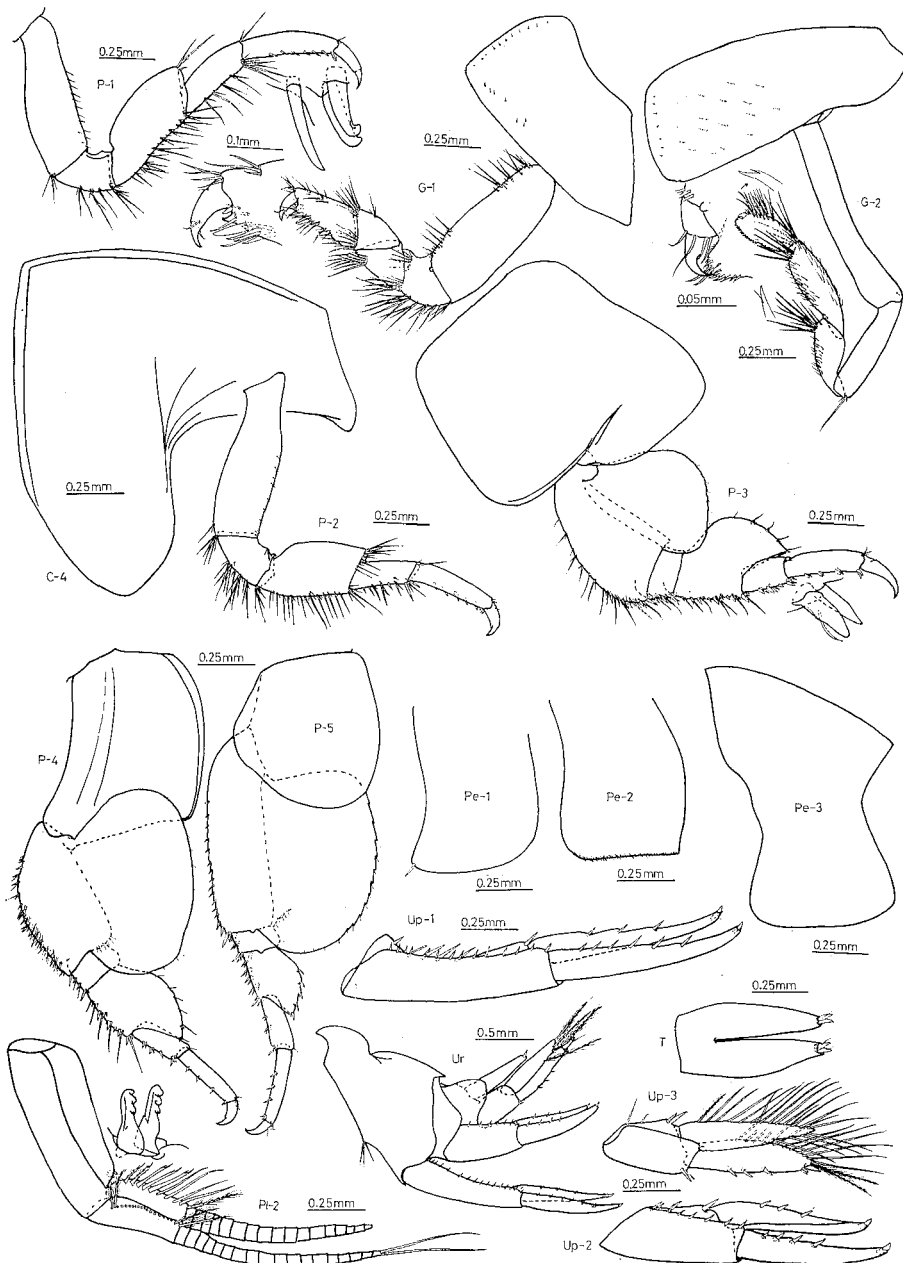


Fig. 206. *Orchomene tomiokaensis* sp. nov. Holotype, female, 10.0 mm.

slender, inner margin of segments 2-3 setose, segment 3 $2/3$ as long as segment 2, dactyl falcate, $2/3$ as long as segment 3.

Gnathopod 1: Minutely subchelate. Basis about half as long as whole gnathopod 1, rather stout, densely setose anteriorly. Ischium densely setose posteriorly. Merus triangular, posterior margin as long as one of ischium, distally provided with 1 transverse row of setae. Carpus similar to merus in size and form. Propod rectangular, gradually decreasing in width, posterodistally provided with 1 spine; palm very short, defined by tooth, provided with 1 spine near base of dactyl. Dactyl falcate, extending far beyond palm when closed.

Gnathopod 2: Minutely chelate, slender, uniform in width. Ischium longer than half as long as basis, posterodistally provided with 1 prominent and 2 minute setae. Merus hairy on median half part of posterior margin, posterodistally setose. Carpus as long as ischium, slightly dilated medially, bristly, distally provided with setae. Propod longer than half as long as carpus, distinctly produced posterodistally, densely bristly on posterior margin, anterior half part from distal end densely setose in transverse rows, these setae bifid. Dactyl geniculate, overlapping with posterior extension of propod when closed.

Pereopods 1-2: Coxa 3 similar to coxa 2. Coxa 4 boot-like, prominently extended backward in right angle at about middle, ventral part twice as broad as basal one. Pereopods 1-2 similar. Carpus lacking spines in pereopod 1 but in pereopod 2 armed with several spines and especially posterodistally provided with 1 pair of spines. Propod in pereopod 1 posteriorly provided with 6 single spines and 1 pair of locking spines but pereopod 2 less 1 spine in single ones than pereopod 1, locking spines hooked.

Pereopod 3: Coxa $5/3$ as deep as coxa 4, posterior lobe rectangular. Posterior thin plate of basis prominently expanded medially, extending far beyond ischium, $1/4$ part of anterior margin from distal end hairy, armed with 4 single and 2 distal spines. Ischium hairy anteriorly, anteriorly provided with 1 median and 2 distal spines. Merus prominently expanded backward, posteriorly extended to distal end of carpus, anteriorly provided with many spines, posteriorly provided with 1 median small seta and 4 groups of 1 spine and 1 small seta. Carpus $3/4$ as long as anterior length of merus, anterior spine formula 2-2-1-4. Propod 1.5 times as long as carpus, anteriorly provided with 4 couples of spines, one of these pairing spines blunt and armed with 1 seta. Dactyl falcate, about $2/3$ as long as propod.

Pereopod 4: Coxa 6 deeper than wide. Posterior thin plate of basis most expanded basally, produced upper-ward, anterior margin of muscular part most expanded medially, provided with many spines in singles and pairs, hairy on half part from distal end. Ischium anteriorly provided with 2 groups of 1 spine and 1 small seta, and 1 distal group of 1 pronounced and 2 small spines. Merus posteriorly extended to $1/3$ of carpus from distal end, anteriorly provided with 5 groups of 1 stiff seta and 2 or 3 spines, and 1 single spine. Carpus a little shorter than anterior length of merus, anterior spine formula 2-2-1-3. Propod about 1.5 times

as long as carpus, anteriorly provided with 4 couples of spines. Dactyl falcate, rather small.

Pereopod 5: Coxa 7 produced forward. Basis larger than one of pereopod 4, posterior thin plate subrectangular, rounded distally, serrate marginally, muscular part perpendicular anteriorly, anteriorly provided with 15 single spines and 1 distal group of 4 spines. Segments from ischium to dactyl similar to those of pereopod 4 except for merus lacking stiff setae and posteriorly provided with 5 groups of 1 pronounced and 1 minute spines.

Pleopods: Pleopod developed. In pleopod 2, peduncle about half as long as rami; proximal segment of outer ramus with 5 bifid and 5 simple setae, these setae pinnate, one of inner ramus with 1 longitudinal row of 20 pinnate setae; terminal swimming setae about $1/3$ as long as rami.

Uropods: Uropod 1 not extending beyond other uropods, peduncle equal to rami in length, hairy, provided on outer margin with 14 spines, on inner proximal half margin with 5 spines and inner-distally with 1 spine; both rami equal-sized, each apically armed with 1 nail spine, outer ramus provided with 6 spines, inner ramus with 3 spines. In uropod 2, peduncle about $2/3$ as long as rami, provided on outer margin with 7 spines and on inner margin with 2 proximal and 1 distal large spines; both rami equal-sized, each apically armed with 1 nail spine, else outer ramus provided with 4 spines and inner ramus with 3 spines. In uropod 3, peduncle as long as outer ramus, ventrodistally provided with 1 couple of spines, outer margin upper-distally provided with 1 small spine and upper margin of inner side with 2 proximal setae and 1 distal couple of spines; rami foliaceous, outer ramus biarticulate, terminal segment very small, proximal segment provided with 3 median spines and 1 distal group of 1 pronounced and 2 spines, on inner margin except for proximal $1/3$ part with 14 pinnate setae, inner ramus provided with plumose setae on inner margin and $1/3$ part of outer margin from apex.

Telson: Telson slightly expanded at $1/3$ from base, deeply cleft beyond $1/3$ part from base, each lobe apically armed with 2 spines.

Material examined. Holotype: Female, 10.0 mm. Type-locality: Ariake Sea. Date: June, 1976. Paratype: 2 specimens. Collection No.: AMBL-Amph. 61.

Remarks. The present species obligates to the definition of the *Orchomene* group very well but is distinguished from the known species of this group by the following characteristics; in the present species, (1) molar process small, prominently produced, conical and densely hairy, (2) propod of gnathopod 1 distinctly produced posterodistally and palm defined by tooth instead of spines, and (3) mandible basally provided with palp.

***Orchomene orchospina* sp. nov.**

(Figs 207–208)

Body: Very similar to *Orchomene tomiokaensis* (the present paper) in external

appearance except for eyes smaller and oval, and pleonal epimeron 1 lacking antero-ventral spine.

Antennae: Antennae almost as long as lateral head length. In antenna 1, segment 1 of peduncle bulbous, flattened on inner side, proximal half part of segments 2-3 concealed by preceding segment; accessory flagellum biarticulate,



Fig. 207. *Orchomene orchospina* sp. nov. Holotype, female (?), 3.0 mm.

half as long as primary flagellum, segment 1 longer than segment 1 of primary flagellum, segment 2 small; primary flagellum 4-articulate, segments subequal in length, gradually reducing in thickness, segment 1 provided with 1 proximal transverse row of 4 aesthetascs and 1 median couple of aesthetascs, segments 2-3 distally provided with 1 aesthetasc. In antenna 2, gland cone minute, segments 3-5 of peduncle subequal in length, segment 3 ventromedially provided with 1 seta; primary flagellum 4-articulate, segment 2 the longest of them.

Mouthparts: Upper lip ordinary in the genus *Orchomene*, upper lobe of epistome not prominently produced. Lower lip lacking inner lobe; outer plate broadly expanded basally, mandibular process medium, shoulders triangular, each provided with 1 acute tooth. Inner plate of maxilla 1 medium, apically provided with 2 setae pinnated on distal half part; outer plate armed with 8 serrate teeth; palp biarticulate, proximal segment about 2/3 as long as whole palp, apex of distal segment rounded, bluntly serrate, provided with 1 stout spine. Inner plate of maxilla 2 dispersively hairy, inner 1/3 part from apex provided with 2, 1, 2 and 3 apical stiff setae; outer plate apically provided with 1 pectinate, 3 bifid and 5 simple stiff setae. Mandibles similar to those of *Orchomene tomiokaensis* (the present paper) except for palp; segment 2 of palp about twice as long as terminal segment, distally provided with only 1 stiff seta, terminal segment long oval, dispersively bristly, on distal margin provided with 4 stiff setae. Maxilliped similar to that of *O. tomiokaensis* (the present species), but inner plate provided with 3 conical teeth and 3 pinnate and 3 small setae, and palp less setaceous.

Gnathopod 1: Coxa 1 not produced forward anteroventrally. Gnathopod 1 similar to that of *O. tomiokaensis* (the present paper), but much less setaceous and grasping margin of dactyl provided with tooth.

Gnathopod 2: Coxa 2 and gnathopod 2 similar to those of *O. tomiokaensis* (the present paper) except for the following characteristics. Posterodistal end of merus and both anterodistal and posterodistal ends of carpus provided with only 1 seta; anterodistal margin of propod with 1 single and 2 paired spines; dactyl prominently falcate, not prominently overlapping on posterodistal extensions of propod when closed.

Pereopods 1-2: Similar to those of *O. tomiokaensis* (the present paper) except for the following characteristics; much less setaceous, carpus of pereopod 2 lacking spines, propod of pereopods 2-3 provided only with 1 couple of locking spines.

Pereopods 3-5: Similar to those of *O. tomiokaensis* (the present paper) except for the following characteristics; much less setaceous and less spinous, especially ischium, merus, carpus and propod only distally provided with 1 or 2 pairing spines, locking spines similar and normal, basis of pereopod 3 most expanded backward at 1/3 from distal end.

Pleopods: Peduncle of pleopod 1 stout, shorter than rami; outer ramus 6-articulate, its proximal segment provided with 5 setae, inner ramus 5-articulate, its proximal segment provided with 1 bifid and 1 simple setae; terminal swimming setae subequal to peduncle in length.

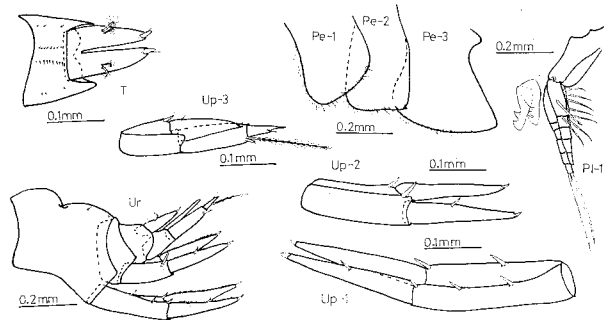


Fig. 208. *Orchomene orchospina* sp. nov. Holotype, female (?), 3.0 mm.

Uropods: Peduncle of uropod 1 longer than rami, provided on outer margin with 3 spines and on inner margin with 2 spines; rami equal-sized, apically armed with 1 nail respectively, else outer ramus medially provided with 1 spine. Peduncle of uropod 2 as long as rami, both upper-distally provided with 1 spine; rami equal-sized, apically armed with 1 nail respectively, else outer ramus medially provided with 1 spine. Peduncle of uropod 3 $2/3$ as long as inner ramus, only inner-distally provided with 1 spine; rami foliaceous, outer ramus biarticulate, proximal segment outer-distally provided with 1 group of 1 spine and 1 pinnate seta, terminal segment half as long as proximal segment, medially provided with 1 cusp armed with 1 minute seta, inner ramus as long as proximal segment of outer ramus.

Telson: Telson cleft near base, each lobe provided with 1 median pair of setules and 1 apical spine.

Material examined. Holotype: Female (?), 3.0 mm. Type-locality: Tomioka Bay. Date: May, 1978. Collection No.: AMBL-Amph. 89.

Remarks. The present species is closely allied to *Orchomene tomiokaensis* (the present paper) in the mandible proximally provided with the palp, and its molar process triangular and hairy. Moreover, these species have the external appearances, head, pereopods in form and the greater part of the mouthparts in common. On the other hand, the present species is distinguished from *O. tomiokaensis* by the following characteristics; in *O. tomiokaensis*, shoulders of lower lip rounded and not armed with tooth, distal part of mandible palp with many spines, accessory flagellum composed of 5 plus 1 rudimental segments, these 5 segments subequal in length, pleonal epimeron 1 anteroventrally provided with 1 spine, distal segment of outer ramus in uropod 3 very small, and each lobe of telson apically provided with 2 spines.

Megaluropus family group

Megaluropus

Megaluropus massiliensis Ledoyer, 1975

(Figs 209–212)

M. massiliensis: Karaman 1979, p. 60–61.

M. agilis massiliensis Ledoyer, 1975: Ledoyer 1975, p. 1307–1309.

Material examined. Female, 3.5 mm. Tomioka Bay. Collection No.: AMBL-Amph. 67 (21 specimens).

Body: Head exclusive rostrum subequal to pereonites 1–2 combined in length, rostrum straight, reaching $1/3$ of peduncular segment 1 of antenna 1 from distal end, anterior head lobe prominently produced far beyond peduncular segment 1 of antenna 1, semioval, apically armed with 1 tooth. Eyes large, oval, occupying the greater part of anterior head lobe. Coxa 4 prominently deeper, reaching ventral end of basis of pereopod 3. Pleonites 1–3 subequal in width, pleonite 3 posteriorly serrated; pleonal epimeron 1 rounded, setose anteriorly; pleonal epimeron 2 slightly produced posteroventrally; pleonal epimeron 3 expanded both anteriorly and posteriorly, serrated posteriorly, teeth on upper half part of posterior margin directed downward and the other upward. Urosomite 1 twice as long as urosomites 2–3 combined, anteroventral margin of lateral sides provided with 3 setae; urosomite 3 prominently produced ventrodistally, upper-distal end of both lateral sides armed with 1 spine.

Antennae: In antenna 1, segment 2 of peduncle a little longer than segment 1, segment 3 $2/5$ as long as segment 2; accessory flagellum biarticulate, as long as

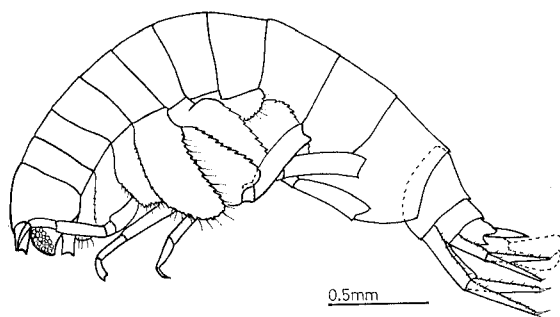


Fig. 209. *Megaluropus massiliensis* Ledoyer. Female, 3.5 mm.



Fig. 210. Distribution of *Megaluropus massiliensis* Ledoyer (●) in the world.

proximal segment of primary flagellum; primary flagellum 7-articulate, segments 3, 5 and 6 distally provided with 1 aesthetasc. In antenna 2, segment 1 of peduncle small, gland cone medium, extending along segment 3, segment 3 stout, densely setose on upper margin in transverse rows, segments 4-5 slender, about twice as

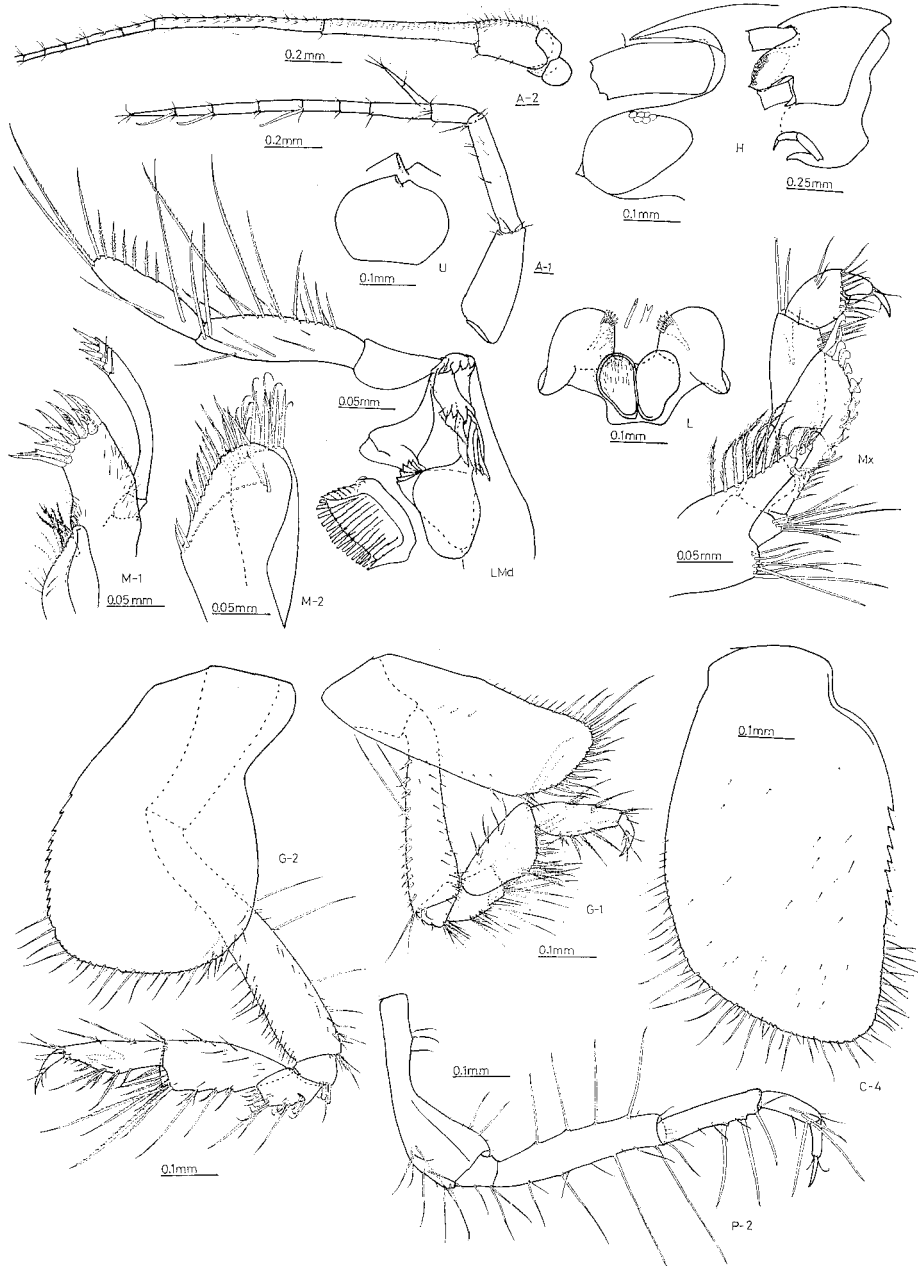


Fig. 211. *Megaluropus massiliensis* Ledoyer. Female, 3.5 mm. A-1: Paratype no. 7, female, 3.75 mm. A-2: Paratype no. 6, female, 3.25 mm.

long as segment 3, upper margin of segment 4 minutely bristly in transverse rows and one of segment 5 dispersively setose in transverse rows.

Mouthparts: Upper lip oval, apical notch asymmetrical. Inner lobe of lower lip medium, reniform, pubescent; mandibular process rather small, shoulders broad, each armed with 1 row of 6 or 7 bifid teeth. Inner plate of maxilla 1 medium, with 8 facial pinnate and 2 apical stout setae; outer plate densely bristly, apically armed with 3 bifid and 8 simple tooth-like spines, bifid spines armed with 1 small tooth on concavity, 4 of simple spines medially provided with 1 to 4 teeth; palp biarticulate, proximal segment very small, apex of terminal segment provided with 4 stout and 1 slender spines and 3 stiff setae arrayed along spines. Inner plate of maxilla 2 broader than outer plate, 22 facial stout setae arrayed in oblique row, inner margin with 13 pectinate setae; outer plate apically provided with 8 stiff and 13 flexible setae. In left mandible, incisor armed with 5 teeth; lacinia mobilis developed, armed with 4 teeth; accessory blades 7, serrated apically; molar process large, produced, rugose, molar rasp medium; palp much developed, segment 2 twice as long as proximal one, provided on upper margin with 7 pectinate setae progressively growing longer, else distally with 1 couple of long pectinate setae, terminal segment $3/4$ as long as segment 2, provided on upper half margin from apex with 6 subequal, pectinate setae and on apex with 3 long pectinate setae. Maxilliped rather small; inner plate apically armed with 4 conical teeth and 2 simple setae, and on inner margin with 11 pinnate setae; outer plate not reaching apex of palpal segment 2, inner and apical margins armed with 10 variable teeth gradually growing longer; palp 4-articulate, segment 2 densely setose on inner margin, outer-distally provided with 1 couple of stout, longer spines, segment 3 upper-distally provided with 1 transverse row of setae, dactyl conical, as long as segment 3, armed with 1 stout, nail tooth.

Gnathopod 1: Simple, normal. Coxa 1 rectangular, ventral and anterior margins setose. Basis $3/7$ as long as gnathopod 1, anteriorly and anterodistally provided with many stout, flexible setae. Merus rectangular, $1/3$ as long as basis, setaceous on anterior and distal margins. Carpus half as long as basis, gradually growing broader, declivious distally, anterodistal and distal margins setaceous, these setae pectinate. Propod $3/4$ as long as carpus, gently rounded on anterior margin, lacking palm, anterior $2/3$ part from distal end pubescent, provided with 5 pectinate setae. Dactyl half as long as propod, falcate, grasping margin medially provided with 2 groups of setae.

Gnathopod 2: Longer than gnathopod 1, simple, normal. Coxa 2 expanded on $2/3$ part from ventral margin, serrated on anterior half margin of ventral one, ventrally with many short and minute setae. Basis about half as long as gnathopod 2, anteriorly setaceous. Ischium posterodistally provided with 4 stout, flexible setae. Merus subrectangular, posteromedially provided with 2 groups of 3 stout, flexible setae and plus 1 short stiff seta in one group, distal stout and flexible setae 7. Carpus twice as long as merus, posterodistally provided with 8 short and long pectinate setae. Propod $3/4$ as long as carpus, slightly and most expanded backward

medially, posterior half margin acclivious, distally provided with 1 spine, pectinate setae formula on central half part of posterior margin 1-2-3-1. Dactyl falcate, overlapping acclivity of propod when closed.

Pereopods 1-2: Coxa 3 long oval, ventrally provided with several short and

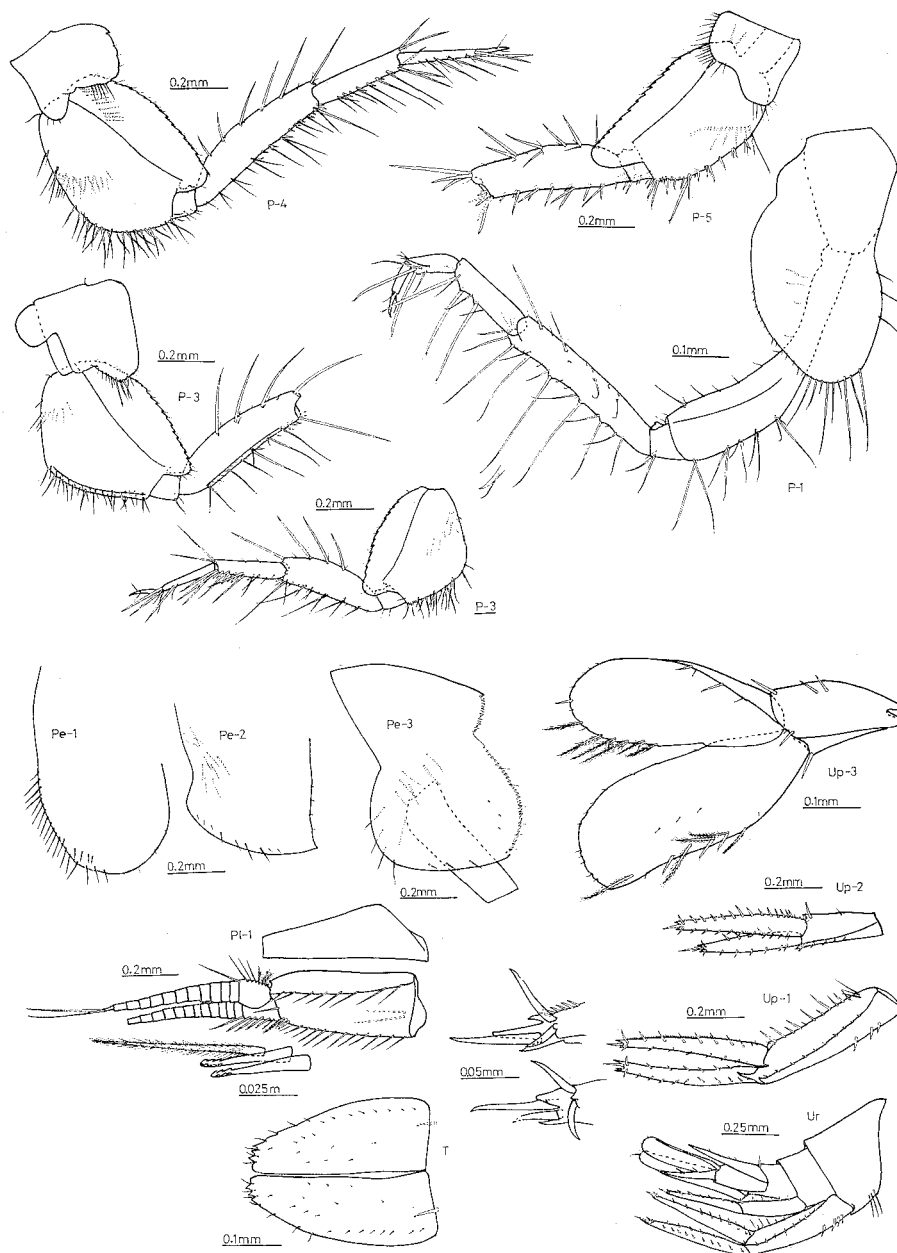


Fig. 212. *Megaloropus massiliensis* Ledoyer. Female, 3.5 mm. P-3: Paratype no. 5, male (?), 2.75 mm.

long setae. Coxa 4 1.5 times as deep as coxa 3, ventral half part marginally setaceous, posterior margin medially serrated. Pereopods 1-2 similar except for basis. Basis of pereopod 1 gently curved, $\frac{3}{7}$ as long as pereopod 1, one of pereopod 2 $\frac{1}{3}$ as long as whole pereopod 2, prominently twisted medially, half part from distal end prominently growing broader. Ratio length among merus, carpus, propod and dactyl including nail 3:1.5:1:1, dactyl provided with 1 long and stout nail; in pereopod 1, merus anteriorly provided with 8 slender spines and 6 short setae, and on posterior $\frac{1}{3}$ from distal end with 2 slender spines, anterior half margin of carpus from distal end provided with 3 slender spines and 3 short setae, 2 locking spines slender, these slender spines elongate; in pereopod 2, merus both anteriorly and posteriorly provided with 4 slender spines, 3 slender spines on anterior margin of carpus more stout than those of pereopod 1, 2 locking spines slender, these slender spines elongate.

Pereopods 3-4: Anterior lobe of coxa 5 anterobasally produced forward. Posterior lobe of coxa 6 posteromedially provided with 1 tooth. Pereopods 3-4 similar. Basis of pereopod 3 most expanded forward anteromedially but most expanded part of pereopod 4 putting in slightly upper side to middle, anterior half part from distal end densely setaceous, posterior thin plate rather slender, extended beyond ischium, serrated marginally. Ratio length among merus, carpus, propod and dactyl 3:2:2:1 in pereopod 3 and 4:2:2:1 in pereopod 4. Posterior spines of merus 4 in pereopod 3 and 6 in pereopod 4, slender, some spines elongate. Carpus posterodistally provided with 1 couple of stout, longer setae, anterior half margin from distal end in pereopod 3 with 5 spines, and 2, 1 and 3 setae, anterior margin of pereopod 4 with 5 groups of 1 spine and 1 longer seta, 1 distal group of 3 stout, longer setae, and several short setae. Propod in pereopod 3 distally provided with 1 stout, longer seta and 1 couple of locking spines, and in pereopod 4 with 3 groups of 1 stout, longer seta and 1 minute one, and 1 couple of locking spines, locking spines slender and long.

Pereopod 5: Coxa 7 deeper in posterior half part than in anterior one, densely setaceous anteriorly. Basis gently expanded forward and spinous anteriorly, posterior thin plate slender, uniform in width, extended far beyond ischium, serrate posteriorly. Merus as long as anterior length of basis, spinous both anteriorly and posteriorly, posterodistal end provided with 1 prominent and 2 obligate spines, these spines elongate. Carpus, propod and dactyl lost in my specimens.

Pleopods: Pleopods well developed. Peduncle of pleopod 1 as long as rami, most expanded forward proximally, posterior side setaceous marginally, coupling spines slender, serrated on half part from distal end, accompanied with 1 plumose short seta; proximal segment of rami weakly developed, one of inner ramus provided with 5 bifid and 1 simple setae, and one of outer ramus with 7 simple setae, these setae short, pinnate; terminal swimming setae half as long as rami.

Uropods: Uropod 1 not extended beyond uropods 2-3, peduncle as long as rami, prominently produced outer-distally in falcate form, outer-ventroproximally provided with 3 spines, both upper-marginally spinous; rami equal-sized, spinous

upper-marginally, inner ramus pectinate on inner half margin from distal end, apically provided with 3 teeth, 1 prominent spine and 1 pair of spines, outer ramus apically provided with 2 teeth, 1 pair of equal-sized spines and 1 couple of 1 pronounced and 1 obligate spines. Peduncle of uropod 2 $2/3$ as long as inner ramus, provided with 1 inner-distal and 5 outer spines; rami similar to those of uropod 1 except for inner ramus distinctly longer than outer ramus and pectinate on inner $1/3$ margin from distal end. Uropod 3 developed; peduncle half as long as rami, ventrodistally provided with 1 spine and ventrally with 1 distal and 2 median spines, else both upper-distally with 1 spine; rami lobate, well developed, equal-sized, provided on inner margin with several groups of 1 spine and 1 plumose seta, single spines and single pinnate setae.

Telson: Telson half as long as uropod 3, subtriangular, completely cleft, each lobe dispersively and minutely bristly, apically truncate and serrate.

Remarks. The present specimens are closely similar to *Megaluropus agilis* (Ledoyer 1975) but distinctly differ from it in the gnathopod 2 of male and the telson, and these characteristics belong to *Megaluropus massiliensis* (Karaman 1979) which arose from *M. agilis massiliensis* (Ledoyer 1975). Nagata (1965c) recorded *M. agilis* from Seto Inland Sea, Japan but probably missed the differences between *M. agilis* and his Japanese specimens because of closely similar external appearances of both species.

The present specimens have some trifle differences from Ledoyer's description and figures; in Ledoyer's, urosomite 1 finely serrated dorsodistally, urosomite 3 setose dorsally, apices of telson not serrate, coxa 4 narrower than one of the present specimens and not serrated posteromedially, anterior head lobe apically provided with 1 notch, and posterior thin plate of basis in pereopod 5 rectangular.

Melitidae

Key to the genera of Melitidae

- | | | |
|---|---|--------------------|
| 1 | Both rami of uropod 3 short, inner ramus scale-like | <i>Cottesloe</i> |
| | Outer ramus of uropod 3 at least elongate..... | 2 |
| 2 | Both rami of uropod 3 equal or subequal in length | 3 |
| | Inner ramus of uropod 3 very small | 5 |
| 3 | Palp of maxilliped triarticulate | <i>Jerbarnia</i> |
| | Palp of maxilliped 4-articulate..... | 4 |
| 4 | Inner plate of maxillae 1-2 setose only on apex..... | <i>Maera</i> |
| | Inner plate of maxillae 1-2 setose both medially and apically | <i>Ceradocus</i> |
| 5 | Gnathopods 1-2 small, equal-sized | <i>Eriopisella</i> |
| | Gnathopods 1-2 ordinary, unequal-sized | 6 |
| 6 | Both gnathopods 2 in male unequal-sized | <i>Dulichella</i> |
| | Both gnathopods 2 in male equal-sized | <i>Melita</i> |

*Cottesloe**Cottesloe cyclodactyla* Hirayama, 1978

C. cyclodactyla: Hirayama 1978a, p. 235-243.

Material examined. Tomioka Bay.

*Jerbarnia**Jerbarnia aquilopacifica* sp. nov.

(Figs 213-215)

Body: Slender, feeble. Head longer than pereonites 1-2 combined, anterior head lobe absent, rostrum vestigial. Eyes small, circular. Pereonites 1-3 short, subequal. Coxae undeveloped, especially coxae 3-7 small, coxae 4-7 not overlapping seriously. Pleonites 1-3 serrated dorsodistally; pleonal epimera 1-3 rectangular, pleonal epimera 1-2 both anteroventrally and posteroventrally provided with 1 spine, ventral margin of pleonal epimeron 3 posteriorly provided with 1 spine. Urosome longer than pleonite 3, urosomite 1 dorsodistally provided with 1 tooth, urosomite 3 dorsodistally provided with 1 pair of spines.

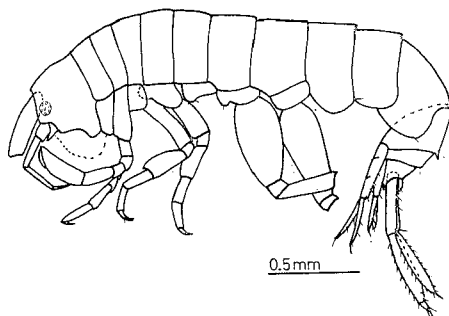


Fig. 213. *Jerbarnia aquilopacifica* sp. nov. Holotype, female (?), 3.25 mm.

Antennae: Peduncular segment 1 of antenna 1 as long as head length, ventrodistally provided with 1 spine, other segments lost. Antenna 2 about 1/3 as long as body length; segment 1 of peduncle scale-like, segment 3 twice as broad as long, gland cone relatively developed, extended beyond middle of segment 3, segment 3 twice as long as segment 2, ventrodistally provided with 1 pair of long setae and 3 short setae, segments 4-5 equal in length, segment 4 ventrodistally provided with 1 spine; flagellum 5-articulate, 4 proximal segments equal in length, terminal segment small.

Mouthparts: Not massive. Upper lip semicircular, slightly concave apically. Inner lobe of lower lip large, pubescent on distal part; shoulders broad, mandibular process medium, taper. Inner plate of maxilla 1 medium, apically provided with

2 pinnate setae; outer plate armed with 4 bifid and 4 simple tooth-like spines; palp biarticulate, extended beyond outer plate, segment 2 longer than twice as long as segment 1, apically armed with 3 thick setae and 4 teeth-like spines. Both plates of maxilla 2 setaceous only on apex. In mandible, incisor and lacinia mobilis broad,

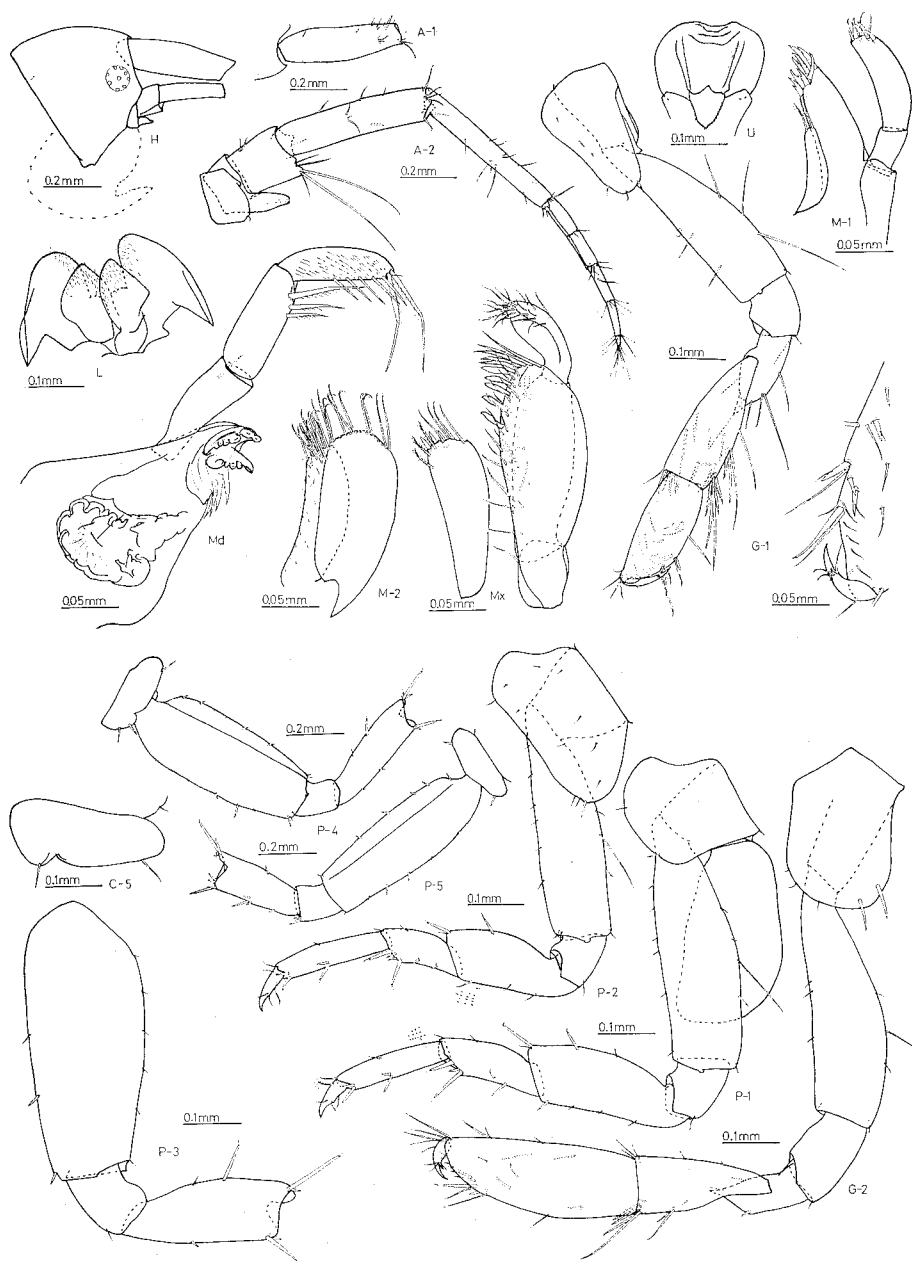


Fig. 214. *Jerbarnia aquilopacifica* sp. nov. Holotype, female (?), 3.25 mm.

armed with 5 or 6 blunt teeth; accessory teeth 4, taper; molar process large, distinctly produced, shriveled, ridged marginally; palp well developed, triarticulate, segments subequal in length, upper 1/3 part of segment 2 from distal end provided with 3 thick, pectinate setae growing longer, segment 3 dispersively bristly, upper margin provided with 5 short stiff setae and 1 apical couple of long setae, proximal half part of these long setae thick and pectinate on one side. Inner plate of maxilliped developed, apically provided with 3 short pinnate and 4 simple setae, and 3 conical teeth; outer plate extending beyond palp segment 2, inner margin dispersively setaceous, about 1/3 part of inner margin from apex provided with 5 spatulate teeth and 5 thick setae gradually growing slenderer; palp triarticulate, rather slender, segment 2 about half as long as whole palp, dispersively setaceous on inner margin, segment 3 gently curved proximally, rounded apically, half part of outer side from apex setaceous in transverse rows.

Gnathopods 1-2: Coxa 1 gradually growing narrower. Coxa 2 subrectangular, posteroventrally provided with 2 spines. Gnathopods 1-2 slender, similar in form except for gnathopod 1 shorter and more setaceous than gnathopod 2, and ratio length of propod to carpus in gnathopod 2 larger than in gnathopod 1. Merus ventrodistally armed with 1 triangular process. Carpus of gnathopod 2 distinctly shorter than propod. Propod uniform in width on half part from base, the other part gently rounded posteriorly, palm defined by 1 group of 1 spine and 1 seta. Dactyl not reaching palmar defining spine, grasping margin armed with 1 tooth.

Pereopods 1-2: Coxa 3 produced forward on ventral half part of anterior margin. Coxa 4 broader than deep, produced both anterodistally and posterodistally, posterodistally provided with 1 spine. Pereopods 1-2 similar except for pereopod 1 shorter. Carpus posterodistally provided with 2 prominent and 1 or 2 small spines. Propod posteriorly provided with 1 medium pair of spines and 1 distal pair of locking spines.

Pereopods 3-5: Coxae 5-7 depressed, both anterodistally and posterodistally armed with 1 or 2 spines. Pereopods 3-5 similar except for carpus, propod and dactyl lost, slender. Posterior thin plate of basis very slender, posteromarginally armed with several spines and setae. Merus about 3/4 as long as basis, both anterodistally and posterodistally provided with 2 or 3 spines.

Pleopods: Pleopods slender, similar. Peduncle of pleopod 2 longer than rami, inner-distally provided with 1 pair of serrate coupling spines; outer ramus 5-articulate, inner ramus longer than outer ramus, 4-articulate, proximal segment longer than one of outer ramus, provided with 2 bifid and 1 simple setae, these setae pinnate; terminal swimming setae subequal to rami in length.

Uropods: Uropod 1 extended beyond peduncle of uropod 3; peduncle longer than rami, outer-ventrodistally provided with 1 spine, upper margin with 3 inner and 5 outer spines; rami equal-sized, truncate, apically provided with 1 pronounced and 2 spines, outer ramus with 3 outer spines, inner ramus with 2 outer small setae and 2 inner median spines. Uropod 2 not extending beyond peduncle of uropod 3; peduncle longer than rami, upper-marginally provided with 2 median opposite,

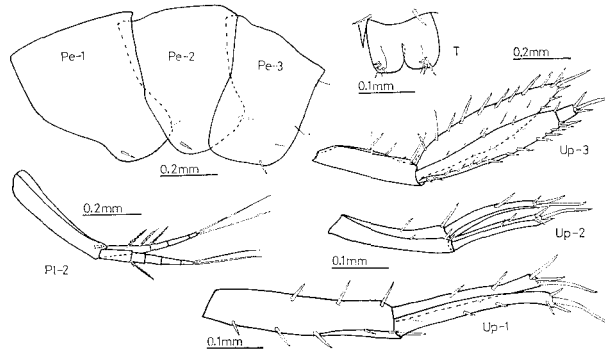


Fig. 215. *Jerbarnia aquilopacifica* sp. nov. Holotype, female (?), 3.25 mm.

1 inner-distal and 2 outer-distal spines; rami equal-sized, truncate, outer ramus provided with 2 median opposite spines, 1 distal pair of spines and 1 apical couple of 1 pronounced and 1 spines, inner ramus provided with 1 inner median and 1 inner distal spines, and 1 apical couple of 1 pronounced and 1 spines. Peduncle of uropod 3 $2/3$ as long as outer ramus, provided with 2 outer and 4 inner spines; rami foliaceous, outer ramus biarticulate, terminal segment small, rectangular, apically armed with 1 pronounced and 2 spines, proximal segment spineus outer-marginally, especially provided on outer distal end with 3 spines, on inner margin with 2 median and 1 distal spines, inner ramus median in length between outer ramus and its proximal segment, spineus marginally, 1 apical spine pronounced.

Telson: Broader than long, small, rectangular, cleft on half part from apex, each lobe ridged on central line, provided with 5 distal spines.

Material examined. Holotype: Female (?), 3.25 mm. Type-locality: Tomioka Bay. Date: May, 1978. Paratype: 2 specimens. Collection No.: AML-*Amph.* 71.

Remarks. Only one species, *Jerbarnia mecochia* (Crocker 1971), is hitherto known to science in the genera *Jerbarnia*. The present species differs from *J. mecochia* by the following characteristics; in *J. mecochia*, (1) palm of gnathopods 1-2 not gently rounded, heavily spineus, (2) propod of gnathopod 2 shorter than carpus, (3) urosomites 1-2 dorsodistally armed with 2 teeth, (4) coxa 2 prominently deeper, (5) outer plate of maxilliped not extended beyond palp segment 2, and (6) coxae 4-7 a little overlapping seriously.

Maera

Maera serratipalma Nagata, 1965

M. serratipalma: Nagata 1965c, p. 300-302.

Material examined. Ariake Sea, Tomioka Bay, Shijiki Bay.

*Ceradocus****Ceradocus (Denticeradocus) inermis* sp. nov.**

(Figs 216-218)

Body: Slender, cylindrical. Head longer than pereonites 1-2 combined, rostrum small, anterior head lobe moderately produced, rectangular, notched ventrally. Eyes smaller, circular. Coxae 1-4 shallow. Pleonites 1-3 serrated dorsally; pleonal epimeron 2 posteroventrally armed with 1 prominent tooth, else ventral margin with 1 tooth at 1/4 from posterior end; pleonal epimeron 3 prominently produced backward in declivity, distinctly serrate on posterior and ventroposterior margins, ventral half margin from anteroventral end provided with 5 spines of which 2 anterior spines are stout. Urosomite 1 dorsodistally serrate, lateral sides ventrodistally armed with 1 spine; urosomite 2 dorsodistally armed with 2 opposite groups of 2 teeth; urosomite 3 prominently produced on ventral and lateral sides.

Antennae: In antenna 1, segment 1 of peduncle longer than head and pereonite 1 combined, ventrodistally provided with 1 group of 1 spine and 3 setules, else with 2 spines on ventral half margin from base, segment 2 longer than segment 1, provided on ventral 1/3 part from base with 2 spines, segment 3 about 1/5 as long as segment 1; accessory flagellum composed of 4 plus 1 rudimental segments, 4 proximal segments equal-sized. In gnathopod 2, gland cone slender, extending beyond 2/3 of peduncular segment 3 from base, segment 4 longer than twice as long as segment 3, segment 5 twice as long as segment 3.

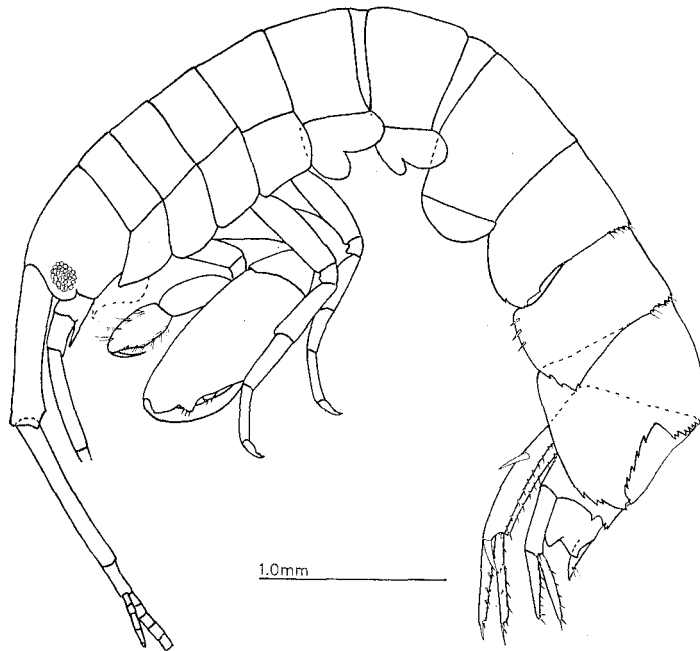


Fig. 216. *Ceradocus inermis* sp. nov. Holotype, male, 6.5 mm.

Mouthparts: Upper lip semicircular, pubescent. Inner lobe of lower lip coalescent in proximal part, well developed; shoulders broad, mandibular process weakly developed. Inner plate of maxilla 1 triangular, medium, on inner margin with 16 unplumose setae; outer plate armed with 4 bifid and 4 serrate tooth-like spines in opposite rows; palp biarticulate, terminal segment subequal to double of proximal segment length, apically provided with 6 slender and 5 thick setae, most apical one of thick setae pectinate. Both plates of maxilla 2 subequal-sized; inner plate truncate, inner half margin from distal end armed with 10 equal-sized, short setae, apex with 2 pectinate and 9 unpectinate setae, facial side with 1 oblique row of 16 setae; outer plate setaceous only on apex. In left mandible, incisor armed with 4 teeth; lacinia mobilis serrate apically; accessory blades composed of 8 slender spines and 1 broad plate; molar process large, broad, provided with 2 spines and 1 stout plumose seta; palpar hump well developed; palp triarticulate, segment 2 about twice as long as segment 1, marginally setaceous, segment 3 shorter than half as long as segment 2, apically provided with 1 couple of long setae. Right mandible similar to left mandible except for the following characteristics; incisor armed with 4 teeth, accessory broad lobe 2, molar process armed with 6 small and broad teeth. Maxilliped medium; inner plate apically provided with 2 spatulate tooth-like spines; outer plate not reaching far beyond distal end of palp 2nd segment, armed on inner and inner-apical margins with 15 tooth-like spines which gradually grow longer and of which 4 apical spines are slender and are armed with minute setae medially; palp 4-articulate, segment 2 setaceous on inner margin, dactyl as long as segment 3, provided with nail.

Gnathopod 1: Coxa 1 produced forward anteroventrally. Gnathopod 1 smaller than both gnathopods 2. Basis $1/3$ as long as gnathopod 1, posterodistally provided with 3 thick setae. Merus semicylindrical, $1/3$ as long as basis, outer-distally armed with 1 small tooth. Carpus as long as propod, inner side dispersively setaceous in rows, thicker setae pectinate. Propod most and gently expanded at middle, posterior margin and palm continuously rounded; palm defined by 1 pronounced spine, marginally provided with about 7 bifid small spines and many minute setae. Dactyl falcate, overlapping on palm when closed.

Gnathopod 2 of male: Coxa 2 square. Left gnathopod 2 prominently larger than right one, but both similar in form of basis, ischium and merus. Merus $2/3$ as long as basis, posterodistally armed with 1 tooth. In left gnathopod 2, carpus triangular, slightly longer than merus, posterior expansion densely setaceous in rows; propod subrectangular, about half length of gnathopod 2, anterior submargin of inner side provided with many spines in 2 opposite longitudinal rows, thick setae formula on posterior submargin of inner side 1-2-2-3-3-4-3-3, palm transverse, defined by 4 spines, deeply concave on half part from posterodistal end, anterior transverse part provided with 2 opposite rows of 3 and 4 spines; dactyl falcate, apically armed with 1 stout nail, reaching middle of propod when closed. In right gnathopod 2, carpus 1.5 times as long as merus, posterior expansion setaceous in transverse rows; propod about twice as long as carpus, posterior margin and palm

continuously rounded, armed with 2 opposite rows of spines throughout, setae formula on anterior submargin 1-2-2-2-2-3-3-3, palm defined by 2 opposite stout spines; dactyl falcate, reaching palmar spines.

Gnathopod 2 of female: Both gnathopods 2 equal-sized, similar to left gnathopod 2 of male.

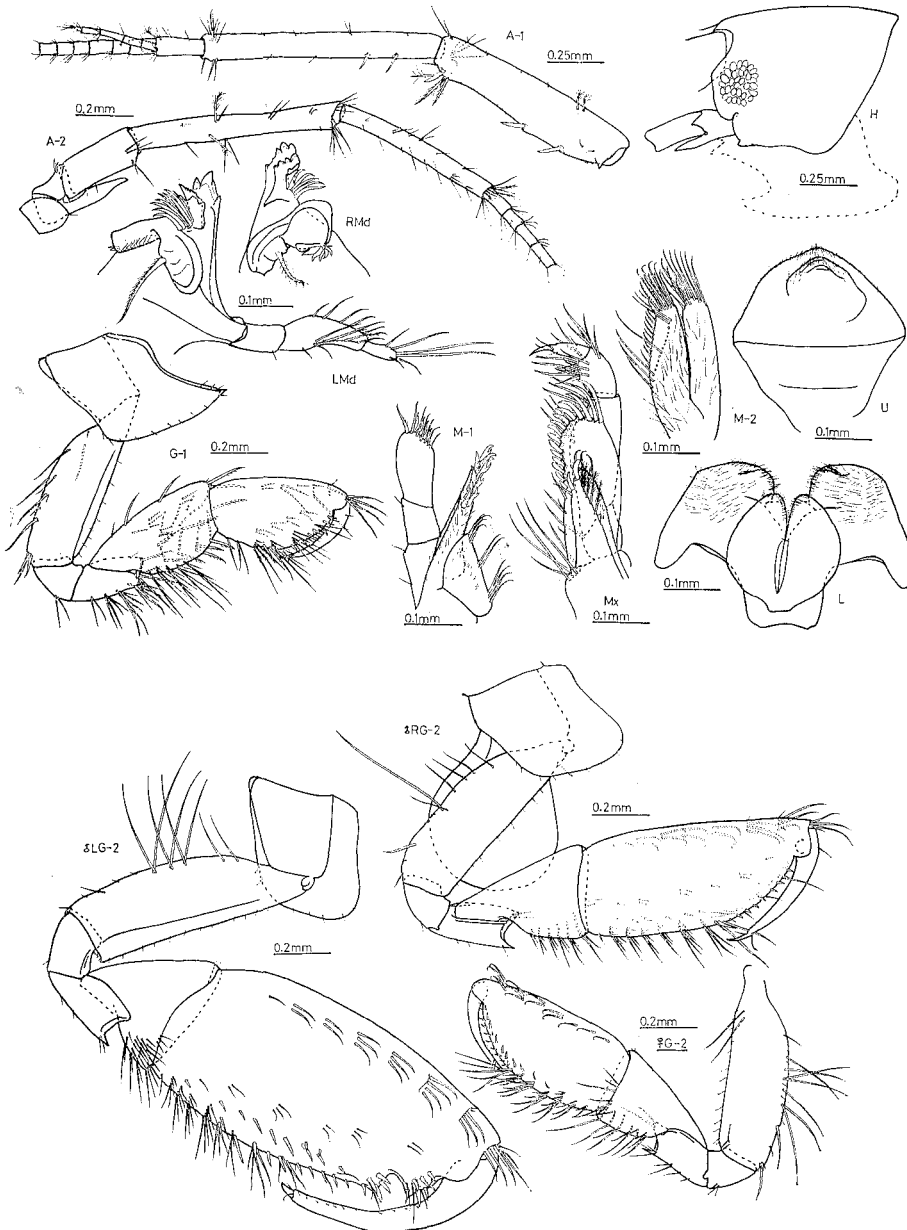


Fig. 217. *Ceradocus inermis* sp. nov. Holotype, male, 6.5 mm. ♀G-2: Paratype no. 5, female, 6.0 mm.

Pereopods 1–2: Coxae 3–4 equal-sized. Pereopods 1–2 similar. Basis 1/3 length of pereopod 1. Merus 3/4 as long as basis, posterior margin lacking spines. Carpus and propod similar in length, posterior margin of carpus provided with 2 median and 3 distal spines, central one of 3 distal spines small, propod posteriorly

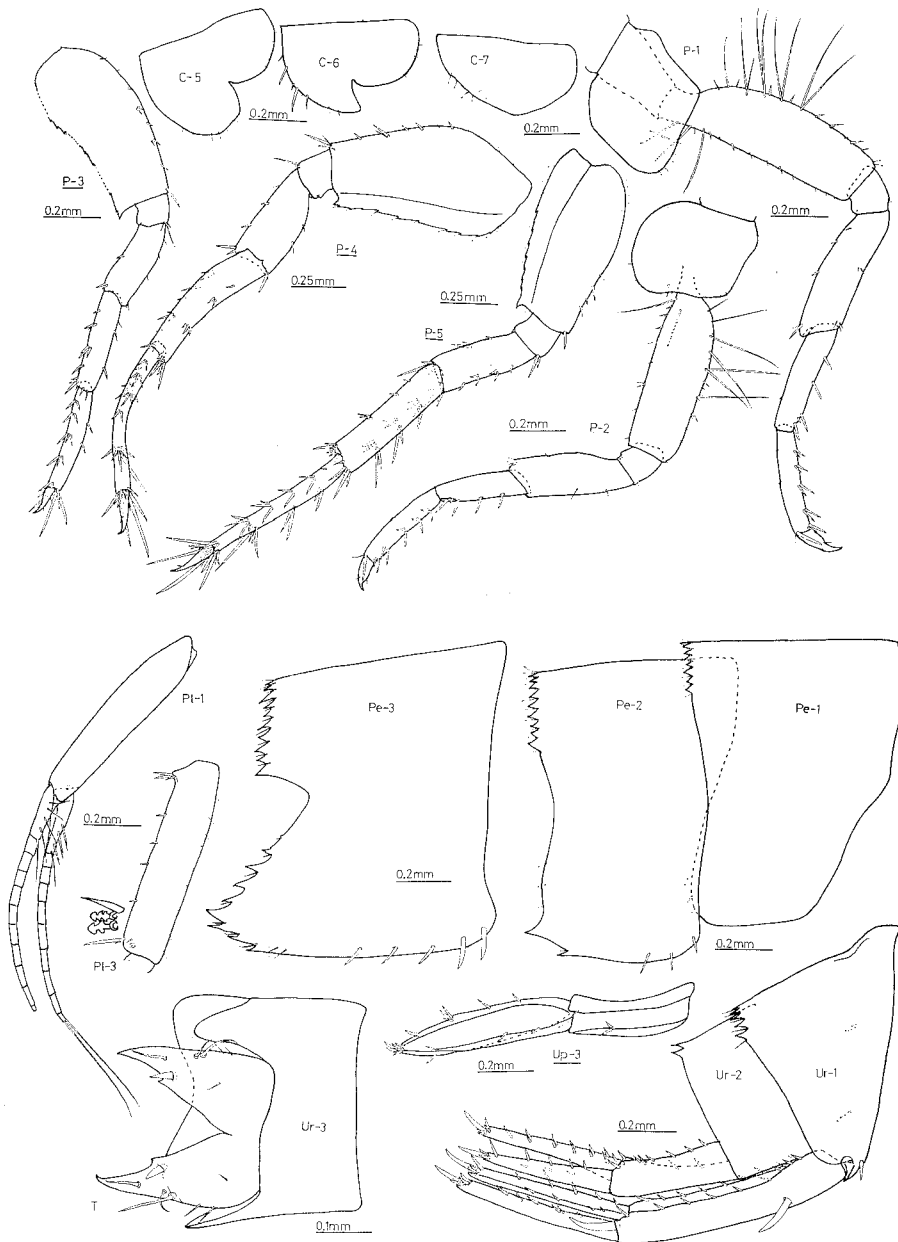


Fig. 218. *Ceradocus inermis* sp. nov. Holotype, male, 6.5 mm. P-3, p-4, p-5 and U-3: Paratype no. 5, female, 6.0 mm.

provided with 5 pairs of spines and anterodistally with 1 spine. Dactyl stout, claw-like distally.

Pereopods 3-5: Coxae 5-7 subequal-sized, anterior margin of coxa 6 provided with 5 spines. Pereopods 5-7 similar in form but pereopod 5 shorter than the others, spinous on carpus and propod. Posterior thin plate of basis slender, not produced distally, serrate marginally, acute distally. Propod longer than carpus, distally armed with several spines. Dactyl longer than carpus, distally armed with several spines. Dactyl similar to one of pereopod 1.

Pleopods: Pleopods slender, developed. Peduncle of pleopods 1-2 similar, provided only with coupling spines, one of pleopod 3 posteriorly with 1 proximal group of 3 spines, 4 small spines and 1 pair of 1 pronounced and 1 small spines, else 1 small spine growing near coupling spines; proximal segment of outer ramus provided with 3 bifid and 1 simple setae; terminal swimming setae half as long as rami.

Uropods: Peduncle of uropod 1 1.5 times as long as rami, provided with 1 stout spine at 1/3 of outer lateral side from base and at outer distal end, upper side margins spinous; rami equal-sized, truncate, produced ventrodistally, apex armed with 2 pairs of small spines and 1 pronounced spine. Peduncle of uropod 2 as long as rami, setaceous on upper margins; rami similar to those of uropod 1 except for shorter and apical smaller spines 2 or 3. Uropod 3 extended far beyond uropod 1; peduncle 2/3 as long as rami, inner margin provided with 1 median pair of spines and 1 distal spine, outer margin with 1 distal spine; rami equal-sized, foliaceous, apically provided with 3 or 4 spines, else marginally with several spines.

Telson: Telson deeply cleft in V-form, each lobe triangular, taper, armed on inner margin with 1 tooth and 1 spine.

Material examined. Holotype: Male, 6.5 mm. Type-locality: Ariake Sea. Date: June, 1976. Paratype: 6 specimens. Collection No.: AMBL-Amph. 60.

Remarks. The present species belongs to the subgenus *Denticeradocus* of *Ceradocus* in pleonal epimera 1-3 dorsodistally serrated. Gnathopods 2 of the male in the present species are asymmetrical and this characteristic is known only in *Ceradocus* (*Denticeradocus*) *serratus* (Sheard 1939, J.L. Barnard 1972a). In *C. (D.) serratus*, the posteroventral margin of pleonal epimeron 1 is serrated, each lobe of telson is medially provided with 2 or more spines and the palm of the female gnathopod 2 is defined by small cusp. These characteristics are not combined with the present species. Moreover, the present species is distinguished from *C. (D.) serratus* by the palmar configuration of male gnathopod 2.

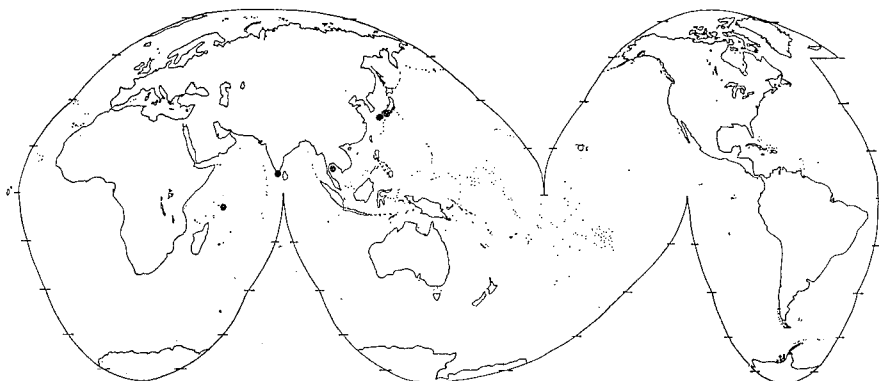
On the other hand, *Ceradocus* (*Denticeradocus*) *spinifera* (Ledoyer 1973b) has been known only in female but the present species is also distinguished from it by the pleonal epimeron 1 posterodistally armed with 1 tooth, the pleonal epimeron 2 posteriorly serrate, the inner plate of maxilliped lacking the conical tooth, the basis of pereopods 3-5 prominently produced posterodistally, and the telson armed with many spines.

*Eriopisella**Eriopisella sechellensis* (Chevreux, 1901)

(Fig. 219)

E. sechellensis: K.H. Barnard 1935, p. 284-285; Nagata 1965c, p. 304-305.

Material examined. Tomioka Bay, Shijiki Bay.

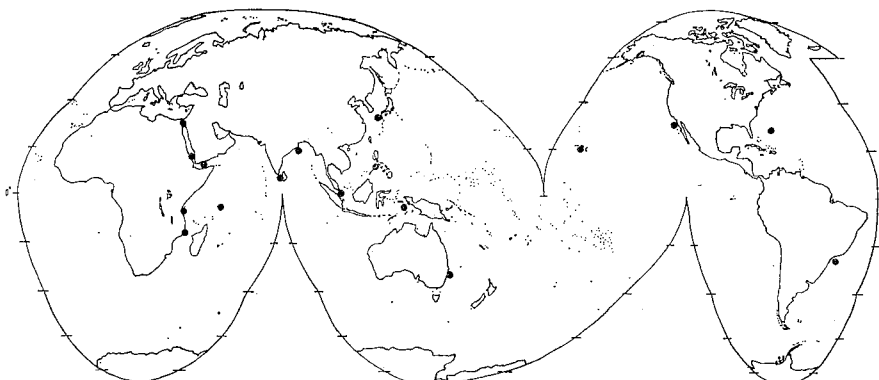
Fig. 219. Distribution of *Eriopisella sechellensis* (Chevreux) (●) in the world.*Dulichieilla**Dulichieilla appendiculata* (Say, 1818)

(Fig. 220)

Melita appendiculata (Say, 1818): Hirayama & Kikuchi 1989, p. 67-77.

Material examined. Tomioka Bay.

Remarks. See Hirayama & Kikuchi's literature (1989). *Dulichieilla* was divided from *Melita* by Karaman & J.L. Barnard (1979).

Fig. 220. Distribution of *Dulichieilla appendiculata* (Say) (●) in the world.

(To be continued)